



**Prevalence and factors associated with inpatient complications of
thyroidectomy among adult patients operated at St. Paul's Hospital
Millennium Medical College, Addis Ababa.**

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ABSTRACT

Background: There are a number of complications following surgeries of thyroid like RLNP, hypoparathyroidism, hypothyroidism, external superior laryngeal nerve injury, bleeding, hematoma, Seroma .

Objective: To determine prevalence and associated factors of post thyroidectomy complications at SPHMMC, Addis Ababa, Ethiopia.

Methodology: Prospective institutional based study of adult who have undergone thyroid surgery at SPHMMC from December,2017 to April ,2017.

Result: A total of 195 cases of thyroidectomy were performed over the study period at SHPMMC. The female to male ratio was 8.75:1.the mean age is 40.7 years.Controlled Multinodular goiter (CTMNG)is the commonest indication for thyroidectomy in this study, (99,50.8%) of the patients followed by others like the patient request (38,19.5%) and suspicious nodule (31,15.9%).

STT was the commonest procedure performed in 44.6% of patients, followed by Dunhill's procedure (21.5%) ,NTT (13.8%).

Post thyroidectomy complications happened in 23 patients (11.8%) of which hypocalcaemia were the commonest (11,5.6%). The statistically significant risk factor is type of thyroidectomy ($p=0.000,95\%$ CI).among which TT carries more risk with OR of (lobectomy and isthmusectomy are 84 less likely , STT 196 times less likely, Dunhill's thyroidectomy 42 times likely and NTT 30 times less likely) to have complication.

Conclusion and Recommendation: Complication rate after thyroid surgery was 11.8% of the cases: of which hypocalcaemia/hypoparathyroidism was the commonest in 11(5.6%)of the patients. The statically significant risk factors with p value < 0.05 according to this result is TT. Large scale study with longer period should be conducted for a better generalizations.

Key Words: Thyroidectomy, Complications, hypocalcaemia, hypoparathyroidism

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ABBREVIATION AND ACRONYMS

CTMN: Controlled Toxic Multi nodular Goiter

G.C: Gregorian calendar

NTT: near Total Thyroidectomy

RLNI: Recurrent Laryngeal Nerve Injury

RLNP: Recurrent Laryngeal Nerve Palsy Post op Post-operative

SPHMMC: St Paul's Hospital Millennium Medical College

SPSS: Statistical Package of Social Sciences

STT: Sub Total Thyroidectomy

TT: Total Thyroidectomy

CHAPTER ONE

INTRODUCTION

1.1. Background

The term thyroid gland (Greek thyreoeides, shield-shaped) is, however, attributed to Thomas Wharton in his *Adenographia* (1656). Surgery is one of the options of management for different types of thyroid pathologies like thyroid nodules, hyperthyroidism, differentiated thyroid cancer, e.g. papillary, follicular, medullary thyroid cancer, anaplastic thyroid cancer, obstructive or substernal goiter, etc. Nerves, parathyroids, and surrounding structures are all at risk of injury during thyroidectomy. Therefore there are a number of complications following surgeries of thyroid with various risk factors. Injury to the RLN may occur by severance, ligation, or traction, but should occur in <1% of patients undergoing thyroidectomy by experienced surgeons. Approximately 20% of patients are at risk of injury to the external branches of the superior laryngeal nerve, especially if superior pole vessels are ligated en masse.¹ Thyroid pathology are one of the common problems globally; it constitutes the second most common endocrine disease following diabetes mellitus as to the results of researches from different countries.^{2,3}

1.2. Statement of the problem

Nerves, parathyroids, and surrounding structures are all at risk of injury during thyroidectomy. Injury to the RLN may occur by severance, ligation, or traction, but should occur in <1% of patients undergoing thyroidectomy by experienced surgeons. Approximately 20% of patients are at risk of injury to the external branches of the superior laryngeal nerve, especially if superior pole vessels are ligated enmasse¹.

The cervical sympathetic trunk is at risk of injury in invasive thyroid cancers and retro esophageal goiters and may result in Horner's syndrome. Inadvertent removal of parathyroid tissue) has been reported in up to 50% of cases, but permanent hypoparathyroidism occurs <2% of the time¹. Postoperative hypocalcaemia is more likely in patients who undergo concomitant thyroidectomy and central and lateral neck dissection and hematomas or bleeding may also complicate thyroidectomies¹.

We don't have our own adequate local data that shows about prevalence of post thyroidectomy Complications and associated risk factors here in SPHMMC.

1.3 SIGNIFICANCE OF THE STUDY

From researches done in Pakistan and UK, transient hypoparathyroidism was 2.8%-27.6% while the permanent was 0.7%-4.8%. RLNP 2.5%-2.8%. Over all complications from the Pakistan result was about 10.7%^{4, 5}.

One of Malaysia study also showed that hypocalcaemia was 26.67%, hematoma after recurrent surgery was 6.67%, hoarseness of voice happened in 13.3% of the patients⁶.

For the fact that thyroid disease are very common pathologies we encounter in our setup where there is training for residents who are engaged in performing thyroidectomies , it is clear that we face significant number of complications following different kinds of thyroid surgeries.

There are also no adequate published research results regarding this particular topic in our country; thus, this research will to some extent help us to have our own local data regarding the stated topic and it will initiate other researchers for further subsequent studies. Moreover it will guide us to clearly identify the associated risk factors for the post thyroidectomy complications and devise a mechanism to minimize the complication if possible.

Therefore, this research somehow will have benefits in terms of better patient outcome, and better quality training delivery for the residents.

CHAPTER TWO

LITERATURE REVIEW

There are a number of complications following surgeries of thyroid like RLNP, hypoparathyroidism, hypothyroidism, external superior laryngeal nerve injury, bleeding, hematoma, Seroma¹.

Thyroid pathologies are one of the commonest endocrine pathologies worldwide. It constitutes the second most common endocrine disease following diabetes mellitus per researches done in some countries^{2,3}.

The study done in Gondar collage of Medical sciences, north western Ethiopia, among total of 137 case records of thyroid operations which were analyzed and there were 36 postoperative complications observed in 20 patients. Considerable hemorrhage that required transfusion occurred in 11 (8%) patients. 8 patients developed airway obstruction out of which 6 required tracheotomy. Transient tetany Occurred in 4 patients after subtotal thyroidectomy⁴.

In a study performed in Pakistan about 10.7% of the patients studied, developed complications with wound infection 0.7%, postop bleeding 1.4%, Seroma 1.4% and the following with their respective figures. Ages above 30, male sex and more extensive surgeries were the associated factors for increased prevalence of the post op complications⁵.

RLNP on the other hands happened in about 2.8% (1.4% temporary, 1.4% permanent) in the study analyzed in Pakistan, 1.6% transient and 0.9% permanent in study done UK study^{5,6}. Graves' disease (OR 2.7), thyroiditis (OR 2.1), recurrent goiter (OR 2.3), malignant disease (OR 1.7) and TT and NTT thyroid resection (OR 1.6) were all independent risk factors for transient⁶

RLNP. When multivariate analysis was confined to permanent RLNP, Graves' disease (OR 2.2) and recurrent goiter (OR 1.7) emerged as independent risk factors.⁶

In contrast, gender, age and specimen weight above 45 grams were not found to play a role in transient or permanent RLNP.⁶

On multivariate analysis for transient hypoparathyroidism, the extent of surgical resection (OR 2.2), Graves' disease (OR 2.1), recurrent goiter (OR 1.7), female gender (OR 1.5) and specimen Weight above 45 grams (OR 1.6) constituted independent risk factors.⁶

When multivariate analysis was confined to permanent hypoparathyroidism, the extent of surgical resection (OR 2.7), Graves' disease (OR 1.8), recurrent goiter (OR 1.5) and malignant disease (OR 1.5) emerged as significant predictors.⁶

Results from the Pakistan study, the UK study, a Malaysia study and an India study showed hypocalcaemia/hypoparathyroidism occurred in 3.5% (temporary 2.8%, permanent 0.7%), 32.4% (temporary 27.6%, permanent 4.8%), 26.67%, and 16% respectively^{5,6,7,8}. Complications were more common with total thyroidectomy⁸.

Studies done in India and Saudi Arabia on prevalence of RLNP also showed close results with 2% in India, 3.2% transient and 0.3% permanent in Saudi Arabia^{8,9}.

The Saudi Arabia result detected that the prevalence of RLNP was more common in secondary surgeries than primary surgeries, in malignant diseases than the benign ones, in non-identification of the nerve during operation than identification of the nerve and in more extensive surgeries like TT or NTT. However, there was no significant difference in the incidence of RLNI in terms of gender (4.1% in males vs.3.8% in females, $p=0.849$)⁹.

Study done in UK showed 5/41 units had more than one airway complication in the last 5 years, and these surgeons fell into the 4–7-year, 8–10-year and more-than-10-year-experience groups, and 100% (4/4) of the surgeons with 1–3 years' experience had no air units who had performed more than 30 thyroidectomies, 19 had no complications (58%), 10 had airway complication (30%), and 4 units (12%) had more than one airway complication in the last five years. 44% (8/18) of the units with complications, 44%(8/18) had one airway complication, and 12% (2/18) had more than one airway complication¹⁰.

In the research done in Spain complications were presented by 62 patients (21%), corresponding to 29 hypoparathyroidism, 26 recurrent laryngeal nerve injuries, 4 lesions of the superior laryngeal nerve, 3 cervical hematomas, and 1 infection of the cervicotomy.

The variables associated with the presence of these complications were hyperthyroidism ($P0.0033$), compressive symptoms ($P0.0455$), intrathoracic component ($P0.0366$), goiter grade ($P0.0195$), and weight of excised specimen ($P0.0302$); hyperthyroidism (relative risk 2.5) and intrathoracic component (RR 1.5) persisted as independent risk factors.

Definitive complications appeared in 3 patients (1%), corresponding to 2 hypoparathyroidism and 1 recurrent laryngeal nerve injury. Two cases corresponded to a toxic goiter, and the third to an intrathoracic goiter with compressive symptoms¹¹

Another study done in Spain revealed incidence of temporary hypocalcaemia was 40.8% (136 patients), and of definitive hypoparathyroidism 4.2% (14 patients). Reoperation or total thyroidectomy, neck dissection, hyperthyroidism, operative time and age above 50 years were factors related to higher incidence of hypocalcaemia and definitive hypoparathyroidism ($p < 0.05$)¹².

Assessment of complications on one of studies done in Korea showed that symptomatic hypoparathyroidism occurred in 757 patients (28.7%), of whom 749 (28.4%) cases were transient and 8 (0.3%) were permanent hypoparathyroidism. And the incidence rates increased with increasing extent of surgery. The incidence of incidentally removed parathyroids during surgery was not different between groups ($P=0.002$). The incidence of RLN palsy, which was 0.8% in all patients, was also significantly related to the extent of surgery, with incidences of 0.5%, 0.6%, 1.2%, and 3.1% in Groups I, II, III, and IV, respectively ($P=0.026$).

By contrast, the incidence of hematoma, which was 0.5% overall, was not associated with the extent of surgery ($P=0.744$). The incidence rates of other complications were also significantly associated with the extent of surgery. For example, Seroma, which was reported in 4.7% of all patients, was 3.9%, 3.7%, 7.7%, and 8.3% of patients in Groups I, II, III, and IV, respectively ($P=0.002$). Chyle fistula, which had an overall incidence of 1.8%, was reported in 0.5%, 0.8%, 5.1%, and 6.2% of patients in Groups I, II, I syndrome, which had an overall incidence of 0.2%, was reported in 0%, 0%, 0.8%, and 1.0% of patients in Groups I, II, III, and IV, respectively ($P=0.001$)¹³.

CHAPTER THREE

OBJECTIVES OF THE STUDY

3.1 General Objective

To assess prevalence and associated factors of post thyroidectomy complications among operated at SPHMMC

3.2 specific objectives

To study the sociodemographic characteristics of patients admitted for Thyroidectomy

To find out the commonest indications for Thyroidectomy

To describe prevalence of post thyroidectomy complications

To describe factors contributing for post thyroidectomy complication

CHAPTER FOUR

METHODS AND MATERIALS

4.1 Study area

The study was conducted in St Paul's Hospital Millennium Medical College in Addis Ababa, (SPHMMC) Ethiopia. SPHMMC is the second biggest hospital from Addis Ababa and all over the country. SPHMMC is located in the Northwestern part of Addis Ababa.

The hospital has a total of 1200 professionals and supporting staffs and 450 beds. On average it provides health service for 16000 inpatients and 200,000 outpatients and 5000 surgeries annually. The hospital has 10 clinical departments. In the department of surgery, the treatment providers include 1 pediatric surgeon, more than 20 general surgeons, 7 orthopedics and trauma surgeons, 3 plastic surgeons, and surgical residents.

4.2 Study Design and period

Prospective institutional based cross-sectional study was conducted from over 5 months period from December 1, 2017 to April 30, 2018.

4.3. Population

Source population: all patients who were admitted to SPHMMC ward during study period.

Study population all patients who were operated for thyroid pathologies at SPHMMC, department of surgery from December 1/2017 to April 30, 2018 E.C. over 5 months period

4.4. Sampling technique and sample size

The minimum sample size required, for a very large population ($N > 10,000$) is:

$$n = Z^2 p (1-p) / d^2$$

Where: n = minimum required sample size

P = population proportion in problem (estimated prevalence) = 0.5; since there is no

Prospective similar research done in our country.

d = degree of accuracy (estimated error) = 5% or 0.05

Z = the standard normal value at confidence interval of 95% = 1.96

$$n = (1.96)^2 * .5 * (1-0.5) / (.05)^2 = 384$$

The minimum sample size from single population = 384

Because the source population (N) is less than 10,000 we will adjust the sample size using the

adjustment formula. N value has been determined to be the average number of patients for whom thyroidectomy was done over a period of one month, which is 45.

The adjusted sample size was calculated to be 142.2 ~142.

To find the total number of patients to be questioned we will add 10% non-respondent rate, 14.2 patients. The final sample size then becomes 156 patients.

4.5. Measurement

Independent variables:—Age, sex, Region, Occupation, and Address, type of pathology, type of surgery, level of profession who performed the surgery, FNAC result

Dependent variables: –Hematoma, Upper airway obstruction, bleeding, Seroma, Infection, Hypoparathyroidism, Recurrent laryngeal/external superior laryngeal injury, thyroid storm

4.6. Data collection technique

Data was collected by first year residents and interns after they were briefed on aim of the study and explanation to each question in data collecting format was given. Data collectors were supervised by the principal investigator thru out the process. Data was collected from reviewing cards of all patients operated for thyroid diseases in the study period and partly from the patients themselves after verbal consent was taken.

Inclusion criteria:-

All patients who were going to have thyroidectomy for any kinds of thyroid diseases whose age was above or equal to 15 years regardless of their gender were included into the study population

All patients who were operated for thyroid pathologies during study period, discharged and readmitted for any complications during study time were included.

Exclusion criteria: –

Patients who weren't willing to be included in the study

Complications other than the one directly related to thyroid surgery, like for instance due to anesthesia, cardiovascular, respiratory problems, etc were excluded.

Patients who had pre-operative known hypocalcaemia of other reasons, RLN palsy were excluded from the study.

Patients who were operated prior to study period but admitted for post thyroidectomy complications within the study time interval.

4.7. Data analysis and interpretation

Data was analyzed using SPSS, version 20, software. Multinomial logistic regression has been used. The analyzed data has been presented using charts, tables, and graphs and described using texts.

4.8 Operational Definition

Adult: age greater than or equal to 15 years.

Hypocalcaemia/hypoparathyroidism: any symptoms and signs of hypocalcaemia like circumoral paresthesia, carpopedal spasm, Trousse's sign, Chvostek's sign or any low value of serum calcium level below the laboratory range.

Recurrent Laryngeal Nerve Paralysis: any clinically recognized low voice, hoarseness of voice, choking, upper airway obstruction of which is not due to hematoma, spasm, etc or laryngoscopically confirmed RLNP.

Unspecified RLNI: there is clinical evidence of unilateral RLNI but difficult to differentiate whether it is right or left unless laryngoscopy is done.

External superior laryngeal nerve injury: inability of the patient to produce high pitched sound after thyroidectomy.

Suspicious nodule: a thyroid nodule in which thyroid malignancy is likely from clinical evaluation or fine needle aspiration cytology description unless ruled out by biopsy

WHO grade I goiter: thyroid enlargement is not visible even with neck extension; only detected by palpation.

WHO grade II goiter: thyroid enlargement is visible upon neck extension of the patient.

WHO grade III goiter: thyroid enlargement is visible without neck extension.

4.9 Quality assurance

Data was checked for completeness and cross checked for accuracy. Defective questioner containing inadequate data were rejected and all the questionnaire and document has been kept properly for possible checking.

4.10. Ethical clearance

Ethical clearance was obtained from SPHMMC ethical review board and written permission was obtained from SPHMMC administrator. The data was kept confidential and used for research purpose only.

4.11. Limitations of this study

As it is a prospective study over short period, 5 months only with small sample size which is not representing the population, therefore, the results could be bias; however, it gives an insight into the present scenario and platform for future research. Because of disproportionally high flow of patients compared to the number of staffs and space we have, some confirmatory investigations for specific clinically suspected complications like Laryngoscopy for RLN injury weren't available timely.

4.12. Plan for dissemination of findings

The research report will be submitted to supervisors, SPHMMC department of surgery, SPHMMC library and other concerned bodies.

CHAPTER FIVE

5.1 Results

A total of 195 cases of thyroid operations were analyzed over the study period.. The female to male ratio was 8.75:1. Three patients (1.5%) of the patients were at the age range of 15-20 years, 41(22%) were between the age ranges of 21-30 years, 57(29.2%) between 31-40 years, 48(24.6%) were between the age 41-50 year making a total 101(51.7%) of the patients between the ages of 21-50 years.the mean age is 40.7 years. Most of the patients; patients (50.3%) came from Addis Ababa followed by patients from Oromia; 80 patients (40.3%). The level of educations of most of our patients was less than 4th grade in about 34.9% cases. About 12 patients presented with anterior neck swelling of less than 1 year, 70 patients with anterior neck swelling of 1-5 years, 74 patients with anterior neck swelling of 6-10 years and 39 patients presented after anterior neck swelling of 10 years. The majority of patients 174(89.2%) presented with a mass size of grade III, while 20 patients(10.3%) with grade II and only 1 patient(0.5%) presented with grade I mass size.

Socio-demographic characteristics		Frequency(N=195)	Percentage (%)
Age	15-20	2	1.0
	21-30	42	21.5
	31-40	59	30.2
	41-50	48	24.6
	51- 60	26	14.3
	over 60	18	10.2
Sex	Male	20	10.2
	Female	175	89.8
Region	Oromia	79	45.6
	Addis Ababa	98	50.3
	Amhara	11	5.6
	Tigray	3	1.5
	Afar	2	1.0
	Somalia	1	.5
	Others	1	.5
Occupation	Housewife	86	44
	Farmer	11	5.6
	Entrepreneur	16	8.2
	Merchant	8	4.1
	Civil Servant	61	31.2
	Others	13	6.7
Level of education	less than 4th grade	68	34.9
	4-8	30	15.4
	9-12	42	21.5
	College	55	28.2

Table 1: Socio-demographic profile of patients operates for goiter at St. Paul's Hospital Millennium Medical College from December 1/2017 to April 30, 2018 E.C. over 5 months period.

One hundred ninety five patients were admitted for surgery on elective and no patient was admitted on emergency for whom thyroidectomy was done. Out of 195 patients 109 were operated on regular side while 86 patients were operated on private wing side. CTMNG is the commonest indication for thyroidectomy in this study, 99(50.8%) of the patients followed by others like patient request and for the sake of cosmeses in 38(19.5%), suspicious nodule 31(15.9%), compressional pressure symptoms 21(10.8%) and malignancy 6(3.1%) of the patients.

STT was the commonest procedure performed in 44.6% of patients, followed by Dunhill's procedure (21.5%) ,NTT (13.8%),lobectomy & isthmectomy (13.3%), TT (4.1%)) and rarely lobectomy (2.6%%).

		Frequency(n=195)	Percent (%)
Indication	CTMNG	99	50.8
	Malignancy	6	3.1
	suspicious nodule	31	15.9
	Pressure symptoms	21	10.8
	Others	38	19.5
Types of thyroidectomy	Lobectomy	5	2.6
	Lobectomy & Isthmectomy	26	13.3
	STT	87	44.6
	NTT	27	13.8
	Dunhill's procedure	42	21.5
	TT	8	4.1

Table 2: indications of thyroidectomy and types thyroidectomies at St. Paul's Hospital Millennium Medical College from December 1/2017 to April 30, 2018 E.C. over 5 months period.

Complication has occurred in 23 (11.8%) patients. Hypocalcaemia is the commonest complication that occurred in 11 patients (in 8 patients as the only complication, in 1 patient together with upper airway obstruction, in 1 other patient together with nerve injury, in the other remaining patient together with hematoma and nerve injury). The second most common complication is nerve injury 5 patients (in 3 patients as the only complication, 1 patient had nerve injury, hematoma and hypocalcaemia, and 1 patient had nerve injury and hypocalcaemia). Among 5 patients with nerve injuries, 2 patients had clinical feature of external superior laryngeal nerve injury, 1 patient had clinical presentation of recurrent laryngeal nerve injury, 1 patient had left RLI confirmed by indirect laryngoscopy and the other patient developed clinical finding of unspecified RLI and external superior laryngeal nerve injury. 4 patients developed upper airway obstruction (3 patients had only upper airway obstruction, 1 patient together with hypocalcaemia). Causes are hematoma, hypocalcaemia and RLNI but not known in one of the patients that could be explained by laryngeal manipulation and improved after hydrocortisone administration..

Hematoma occurred in 4 patients, i.e. in 2 patients as the only complication, in the other 2 in combination of the other complications as mentioned above. 2 patients developed Seroma and only 1 patient had infection after thyroidectomy. In summary hypocalcaemia 11 (5.64%) of the patients, RLNI 3 (1.5%) of the patients, external superior laryngeal nerve injury 3 (1.5%) of the patients. Hematoma and upper airway obstruction occurred in 2.0% of patients each, Seroma (1.0%) and infection (0.5%).

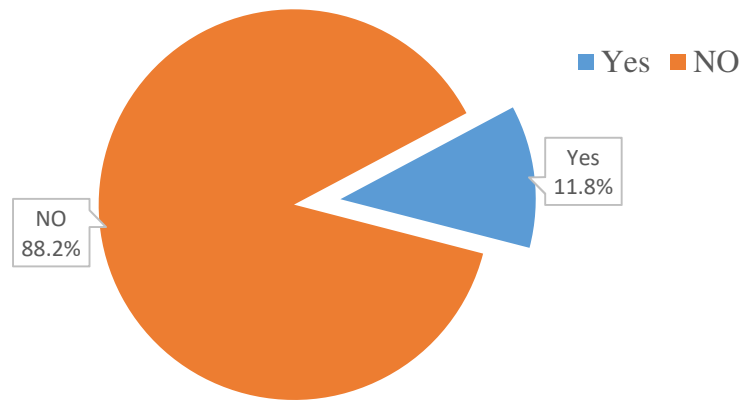


Figure 1.frequency of post thyroidectomy complication at St. Paul's Hospital Millennium Medical College from December 1/2017 to April 30, 2018 E.C. over 5 months period.

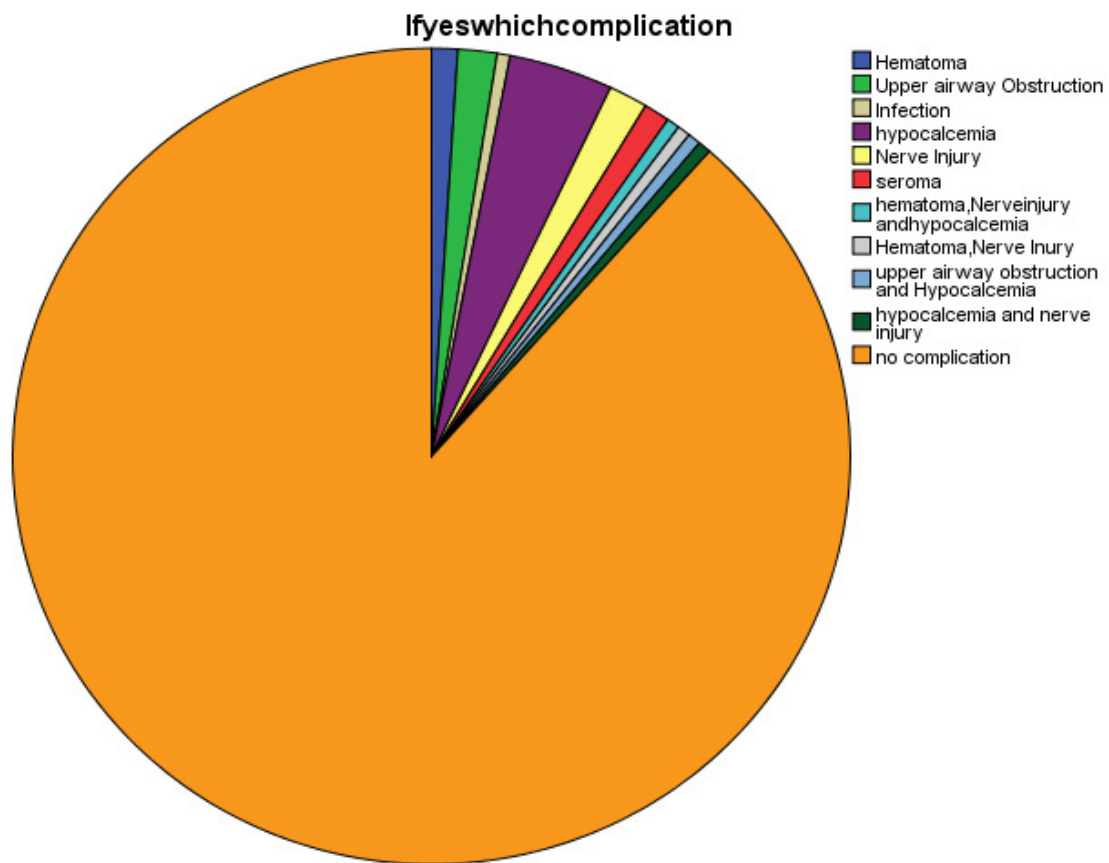


Figure 2. Complications by type at St. Paul's Hospital Millennium Medical College from December 1/2017 to April 30, 2018 E.C. over 5 months period.

Using multinomial logistic regression, among the risk factors for post-thyroidectomy complications studied in this research the statistically significant one is type of thyroidectomy ($p=0.000$ with CI of 95%), among which TT carries more risk for complications after thyroidectomy with OR of (lobectomy and isthmusectomy are 84 less likely , STT 196 times less likely, Dunhill's thyroidectomy 42 times likely and NTT 30 times less likely) to develop complication when compared to TT. Out of 8 patients, 6 patients had features of hypocalcaemia, 1 patient had feature of RLNP and 1 patient had feature of both. Only 1 patient with TT was discharged with out any complication.

Other factors like presence of toxic symptoms on clinical assessments, preoperative mass Size, duration of anterior neck swelling presence of retrosternal extensions, mode of admission (emergency, regular or private wing), mobility, nodularity, consistency, values of T3, T4 and TSH, findings of preoperative neck ultrasound, indications of thyroidectomies and presence of co morbid illnesses are not Statically significant risk factors ($P>0.05$).

5.2 DISCUSSION

The mean age is 40.7 years while it was 38.4 +/- 12.5 years in Tanzanian study and 32.3 years in Gonder.^{2,4} In this study the female to male ratio was 8.75:1 which is higher as compared to similar studies done in Nigeria and Gonder, North Western Ethiopia for which ratio was 5:2 and 5:1 respectively while another study done in Hyderabad, India showed comparable results 9:1 ratio.^{2,4,8} The female : male in our study is greater than that of Gondar, this could be because of most of our patients are from the city and the awareness of bringing the female patients to the health setting is higher.

Most of the patients had long standing goiters as shown by 57.9% of them having the mass for more than 5 years. A study in Gonder showed similar result in which 57% of patients presented after 5 years of illness which is almost similar to ours.⁴ CTMNG is the commonest indication for thyroidectomy in this study; 99(50.8%) of the patients , followed by others like patient request and for the sake of cosmesis in 38(19.5%), suspicious nodule 31(15.9%), compressional pressure symptoms 21(10.8%) and malignancy 6(3.1%) of the patients; In the Gondar study the reason for visit of hospital for 112(81.7%) of the patients was bulk of the gland all of who had thyroid gland

grades of I and IV during presentation which almost make it similar with ours in which case the majority of patients 174(89.2%) presented with a mass size of grade III.⁴ In Tanzanian study 5.3% of presented with grade I mass, 27.6% with grade II and 67.1% grade with III.² Even though the commonest presentation of mass size grade III similar to ours, still the awareness of our patients for early health seeking behaviour is lower than theirs.

STT was the commonest procedure performed in 44.6% of patients, followed by Dunhill's procedure (21.5%), NTT (13.8%), lobectomy & isthmectomy (13.3%), TT (4.1%) and rarely lobectomy (2.6%). While TT was done for 1149 out of 2043, NTT for 779 patients, STT for 111 patients in UK.⁶ The discrepancies could be because of one thing the UK study had much higher number of population size; 2043 studied over longer period and 82 malignancies in which TT is more likely. The second thing is; in our hospital we don't usually perform TT or NTT thyroidectomy specially for benign conditions since most of our patients can't afford life long thyroxine supplementation. therefore we usually provide them STT or Dunhill's thyroidectomy; but the recurrences of toxicities after these surgeries should be studied. In the Gondar study the prevalence of malignancy was 10.2% of which follicular carcinoma was the commonest;⁴ but the prevalence of malignancy in our study is 3.1%; this is most probably because of the endemicity goiter in iodine deficient highland areas like Gondar. Follicular carcinoma is more common in iodine deficient areas.

Complication happened in 23 patients which accounts about 11.8%. Hypocalcaemia is the commonest complication that occurred in 11(5.6%) patients. The second most common complication is nerve injury in 5 (2.5%) patients. Among 5 patients with nerve injuries, 2 patients had clinical feature of external superior laryngeal nerve injury, 1 patient had clinical presentation of recurrent laryngeal nerve injury, 1 patient had left RLI confirmed by indirect laryngoscopy and the other patient developed clinical finding of unspecified RLI and external superior laryngeal nerve injury. 4 patients developed upper airway obstruction. Causes are hematoma, hypocalcaemia and RLNI but not known in of the patient that could be explained by laryngeal manipulation and improved after hydrocortisole administration. In Tanzania however, the overall complication was in 12(7.9%) of the patients and the commonest complication was intraoperative hemorrhage that required postoperative transfusion in 33.3%, hoarseness of voice in 3 patients, infection in 2 patients and transient tetany only in 1 patient.² Most of the prevalence of complications are similar with ours but bleeding is much higher in their study 33.3% versus 2%

that even was post operative hematoma collection. Bleeding was also high in Gondar study 8%;⁴ and this can be explained by the availability of diathermy which might not be that much available that time. Additionally among 137 patients studied in Gondar college of medical sciences there were 36 post thyroidectomy complications observed in 20 patients.⁴ Upper airway obstruction in 8 patients and transient tetany in 4 patients were among complications observed in the Gondar study.⁴ In the study done in Pakistan more or less comparable post thyroidectomy complication as ours were identified; 10.7% total complications of which 3.5% hypocalcaemia/hypoparathyroidism, 2.8% RLNP 1.4% post op bleeding, 1.4% Seroma, 0.7% infection.⁵ In that Pakistan study, ages above 30 years, male sex and more extensive surgeries the associated factors for increased prevalence of post op complications.⁵ In this study however, among the risk factors for post-thyroidectomy complications studied the statistically significant one is, type of thyroidectomy ($p=0.000$) among which TT has the highest risk for complication after thyroidectomy. Like ours the study done in India the risk of post thyroidectomy complication was increased after TT.⁸

In our study using multinomial logistic regression, among the risk factors for post-thyroidectomy complications studied in this research the statistically significant one is type of thyroidectomy ($p=0.000$ with CI of 95%), among which TT carries more risk for complications after thyroidectomy with OR of (lobectomy and isthmusectomy are 84 less likely , STT 196 times less likely, Dunhill's thyroidectomy 42 times likely and NTT 30 times less likely) to develop complication when compared to TT. Out of 8 patients, 6 patients had features of hypocalcaemia, 1 patient had feature of RLNP and 1 patient had feature of both. Only 1 patient with TT was discharged with out any complication. The risks are different in the study done in UK, as mentioned d below.

RLNP on the other hands happened in about 1.6% transient and 0.9% permanent in study done UK study⁶. Graves' disease (OR 2.7), thyroiditis (OR 2.1), recurrent goiter (OR 2.3), malignant disease (OR 1.7) and TT and NTT thyroid resection (OR 1.6) were all independent risk factors for transient⁶

RLNP. When multivariate analysis was confined to permanent RLNP, Graves' disease (OR 2.2) and recurrent goiter (OR 1.7) emerged as independent risk factors.⁶

CONCLUSION AND RECOMMENDATIONS

Conclusion

Majority of the patients were female, with female: male ratio of 8.75:1 and the commonest age was 21-60 yrs in 78% of the cases. Complications after thyroidectomy occurred in 23 patients which accounted 11.8%, of which hypocalcaemia/hypoparathyroidism was the commonest in almost half of individuals with complications. The statically significant risk factors with p value< 0.05 according to this result is TT,

Recommendation

Since this research was done for the limited population while the pathology is a great burden of the institution and targets only on inpatient complications of surgery, larger scale study with longer period should be conducted for a better generalization.

Annex I:

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QUESTIONNAIRE

1. Card No _____
2. Age the patient (years) a) 15-20 b) 20-30 c) 30-40 d) 40-50 e) 50-60 f) > 60
3. Sex of the patient a) Male b) Female
4. Region a) Oromia b) AA c) Amhara d) Tigray e) SNNPR f) Afar g) Somalia h) others
5. Occupation of the patient a) House wife b) Farmer c) Entrepreneur d) Merchant e) Civil servant f) others
6. Education of the patient (in grades) a) < 4th b) 4th -8th c) 9th -12th e) collage
7. Duration of anterior neck swelling a) < 1 year b) 1-5 years c) 5-10 years d) > 10 years
8. Any toxic symptom/signs on clinical assessment? a) Yes b) No
9. If the answer to question above, specify the symptom/s or signs a) Heat intolerance b) Tremor c) Emotional liability d) palpitation e) palmar sweating f) PR>100 when the Patient is calm/ at rest h) others
10. Preoperative presence of hoarseness of voice or choking a) Yes b) No
11. Was there any retrosternal extension? a) Yes b) No
12. Mode of admission of the patient a) Elective b) Emergency
13. If the answer to the above question is elective, it is a) Regular b) private wing
14. Any previous surgery for the thyroid pathology? a) Yes b) No

15. If the answer to the above question is yes, what is the biopsy result (if any?) a) Malignancy
b) Benign c) inconclusive

16. Preoperative size of the mass (based on the WHO grading) a) Grade I b) Grade II c) Grade III

17. Finding on palpation of the goiter and lymph nodes (underline your finding)

I) Mobility a) mobile b) Fixed

II) Nodularity a) single b) multiple

III) Consistency a) soft b) firm c) hard

18. Thyroid function test

I) T3 result a) normal b) high c) low

II) T4 result a) normal b) high c) low

III) TSH a) normal b) high c) low

19. FNAC result of thyroid pathology a) NCG b) Papillary carcinoma c) Follicular neoplasm
d) others

20. If there is no doubt FNAC that the pathology is malignancy, was preoperative Laryngoscopy done? a) Yes b) no

21. If the answer to the above question was yes, what was the finding?

a) Normal bilateral vocal cords b) unilateral affected vocal cord c) bilateral affected vocal cord

22. Preoperative neck U/S

I) LAP identified a) yes b) no

II) Bilateral thyroid involvement a) yes b) no

III) Fixed to surrounding structure a) yes b) no

23. Indication of thyroidectomy a) CTMNG b) malignancy c) Suspicious nodule d) Compressional symptom e) other

24. Type of thyroidectomy performed a) Lobectomy b) Lobectomy & isthmectomy c) STT d) NTT e) Dunhill's procedure f) TT

25. Is there any post thyroidectomy complication? a) Yes b) No

26. If the answer to question above is yes which complication?

I) hematoma a) yes b) no II) Upper airway obstruction a) yes b) no

III) If the answer to question II was yes, what was the cause?

a) Hematoma b) RLNI c) Hypocalcemic Laryngeal spasm d) not known

IV) Bleeding a) yes b) no V) Seroma a) yes b) no

VI) Infection a) yes b) no

VII) If yes, was there any risk factor identified? a) HIV b) DM c) Steroid /Chemotherapy use d) other

VIII) Hypoparathyroidism a) yes b) no

IX) What was/were the symptom/s for hypoparathyroidism? a) Circumoral paresthesia b) Trousseau's sign c) Chvostek's sign d) Carpopedal spasm e) laryngeal spasm

X) Serum calcium level_____ a) normal b) high c) low

XI) Nerve injury a) yes b) no

XII) If yes which one clinically? a) Recurrent laryngeal b) external superior laryngeal

XIII) Laryngoscopy finding a) Normal bilateral vocal cords b) Unilateral affected vocal cord c) Bilateral affected vocal cord d) others

h) Was there any Intraoperative documented/ postoperative feature of thyroid storm? a) Yes
b) no

27. Any Intraoperative difficulty documented a) yes b) no

28. Any co morbid medical illness a) yes b) no;

29. If yes which one? a) Cardiac illness b) bleeding disorder c) renal disease d)
pulmonary disease d) others

DECLARATION

I undersigned declare that this research paper is my original work and all the materials used for this study have been duly acknowledged.

Name of student: **Dr. Mekete Wendosen** (MD, General Surgery Resident).

Signature_____ Date _____

This student research paper has been submitted for examination with our approval

Advisor 1: Dr. Mahteme Bekele (MD, Associate prof of Surgery)

Signature_____ Date _____

Advisor 2: Dr. Kirubel Abebe (MD, Assistant professor of Surgery)

Signature_____ Date _____