A STUDY OF UNFAVOURABLE SURGICAL OUTCOMES AMONG TOTAL THYROIDECTOMY PATIENTS AND THE ASSOCIATED INTRAOPERATIVE RISK FACTORS

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Category- original research paper

ABSTRACT

AIMS AND OBJECTIVES

1. To determine the frequency of occurrence of unfavourable surgical outcomes like hypocalcemia, recurrent laryngeal nerve palsy, hematoma and seroma among patients undergoing total thyroidectomy. 2. To assess the intraoperative risk factors for unfavourable surgical outcomes.

MATERIALS AND METHODS

Patients undergoing total thyroidectomy in ESIC-PGIMSR, Rajajinagar, BANGALORE, Karnataka between January 2019 and June 2020 were considered for the study. Sample size is 50, calculated by using G* power software and analysed using SPSS software with a P value < 0.05 considered significant. It is a longitudinal study. Intraoperative risk factors assessed included 1. Duration of surgery. 2. Method of dissection .(monopolar/bipolar cautery or ligasure vessel sealing system) 3. Method of ligation of vascular pedicles. (vicryl 2-0 suture or ligasure vessel sealing system) 4. Exposure of both recurrent laryngeal nerve. 5. Identification and preservation of 3 or 4 parathyroid glands.

RESULTS:

In the present study, total of 20% had hypocalcaemia, 6% had RLN Palsy, 4% had Seroma and none of the patient had hematoma. The mean duration of surgery was significantly higher in Conventional group as compared to the Ligasure group. About 37.5% patients had RLN palsy among the patients had no exposure of both RLN. About 83.33% of the patients with no Identification and Preservation of 3 or More Parathyroid Glands, developed post- operative hypocalcaemia. There was no association related to the method of dissection and duration of surgery with the seroma formation.

CONCLUSION:

Thus, in our study the most common complication was hypocalcemia >recurrent laryngeal nerve palsy > seroma. There was no hematoma formation in any patient. According to our study, the usage of Ligasure vessel sealing system decreases the duration of surgery significantly. Similarly, Identification and preservation of both RLN reduces the incidence of post-operative RLN palsy and identification and preservation of 3 or 4 parathyroid gland decreases the incidence of post -operative hypocalcemia .

Keywords : Total Thyroidectomy; Hypocalcemia; RLN palsy; seroma.

INTRODUCTION

Surgery is the main stay of treatment for thyroid enlargements. Different types of resections are being individualised on basis of the disease. Surgery is most widely used with the advantage of rapid cure rates but at the same time it has disadvantages of post-operative mortality, morbidity and recurrence of goitre. Post-operative results from thyroid surgeries are usually related to the patient condition, the thyroid disease, surgeon's experience and type of surgery. Thus, the percentages of undesirable results in thyroidectomy surgeries may vary considerably, considering baseline disease persistence or recurrence and post-operative complications. Thyroidectomy complications may be divided into transient or permanent. The transient may vary from severe, life threatening ones, all the way to mild and meaningless events. Permanent complications, represents the main concern of those who treat thyroid diseases surgically. Despite its importance, the risk factors associated with post thyroidectomy complications are not enough analyzed.[1]

While complication rate of thyroid surgery has certainly decreased but they still exist with variable frequency. The commonly observed complications with thyroidectomy includes subcutaneous hematoma 2-10%, respiratory obstruction 5-10%, Recurrent laryngeal nerve palsy 1-3%,parathyroid insufficiency 25-30%,wound infection 1-5%,seroma 3-5%,thyroid hormone insufficiency 15-40% and thyrotoxic crisis as a rare occurrence. Assessment of risk factors and early identification of these complications and effective management is of utmost importance in preventing mortality and morbidity.[2,3]

AIMS AND OBJECTIVES

1. To determine the frequency of occurrence of unfavourable surgical outcomes like hypocalcemia, recurrent laryngeal nerve palsy, hematoma and seroma among patients undergoing total thyroidectomy.

2. To assess the intraoperative risk factors for unfavourable surgical outcomes.

MATERIAL AND METHODS

SOURCE OF DATA

The present study will be carried out among patients admitted in General Surgery ward ESIC-PGIMSR BANGALORE between January 2019 and June 2020.

SAMPLE SIZE: 50

STUDY DESIGN: Prospective study

INCLUSION CRITERIA

1. Patients willing to the informed written consent.(Annexure 2)
2. Patients who undergo total thyroidectomy.

EXCLUSION CRITERIA

1. Patients undergoing subtotal thyroidectomy, near total thyroidectomy and lobectomy.

2. Patients with thyroid swellings with a sub functional or non-functional Recurrent laryngeal nerve as diagnosed by pre-operative Indirect laryngoscopic examination.

3. Patients undergoing thyroidectomy for recurrent thyroid disease and concomitant lymph node dissection.

4. Patients with underlying hypothyroidism or hyperthyroidism.

METHOD OF STUDY AND DATA COLLECTION

All the patients who fulfill the inclusion criteria were evaluated with detailed history, clinical examination and laboratory investigations including pre-operative estimation of corrected serum calcium and pre-operative indirect laryngoscopy to look for vocal cords function.

A minimum of 50 cases undergoing total thyroidectomy will be taken for the study.

STATISTICAL ANALYSIS:

SAMPLE SIZE CALCULATION

Total or near-total thyroidectomy is the treatment of choice for patients with multi nodular goitre and/or thyroid carcinoma. Previous literature reported the prevalence of 25-30% postoperative hypoparathyroidism after total thyroidectomy as one of the important condition.

Sample size was calculated by using G* power software as

-Exact - Proportion: Difference from constant (binominal test, one sample case)

-Options: α balancing: α/2 on each side

-Analysis: A priori: Compute required sample size

-Input: Tail(s) = Two

Effect size = 0.1500000

α error = 0.05

Power (1-β error) = 0.80

Constant proportion = 0.1

- Output: Lower critical N = 0

Upper critical N = 10.0000000

Total sample size = 49

Actual Power = 0.8166132

Actual α = 0.0272277

Total calculated sample size was 49, which was rounded off to 50.

The data will be analyzed using Statistical Package for Social Science (SPSS) version 24. Descriptive statistics with frequency, percentage, mean and standard deviation will be taken. P-value will be taken as significant when <0.05.

INTRAOPERATIVE RISK FACTORS ASSESSED INCLUDE

1. Duration of surgery.

2. Method of dissection .(monopolar/bipolar cautery or ligasure vessel sealing system)

3. Method of ligation of vascular pedicles. (vicryl 2-0 suture or ligasure vessel sealing system)

4. Exposure of both recurrent laryngeal nerve.

5. Identification and preservation of 3 or 4 parathyroid glands.

POST OPERATIVE OUTCOMES ASSESSED INCLUDES

1. Hematoma formation.

2. Hypocalcemia , estimated by corrected serum calcium level below 8.5 mg/dl on post operative day 1 and day 3 , patient being symptomatic or asymptomatic.

3. Recurrent laryngeal nerve injury on day 3 with Indirect laryngoscopy to assess vocal cords.

4. Seroma formation.

METHOD- TOTAL THYROIDECTOMY PROCEDURE

ANAESTHESIA AND POSITION ON THE OPERATING TABLE

General anaesthesia is administered through an endotracheal tube and good muscle relaxation obtained. The patient is supine on the operating table with the table tilted up 15 degree at the head end to reduce venous engorgement. A sand bag is placed transversely under the shoulders and the neck is extended to make the thyroid gland more prominent and apply tension to skin, platysma and strap muscles, which makes dissection easier. The patient head is supported on a ring to avoid rotation of the head. Surgical aspect of the neck from the chin to the suprasternal notch is exposed.

FIG 4.1 POSITION OF THE PATIENT ON OPERATING TABLE

INCISION -The skin incision marked by pressing a length of thread onto the skin just before using the scalpel. A gently curved skin crease low collar kocher incision is made, 2-3 cm above the sternum, extending to the lateral borders of the two sternoleidomastoids. With large goiters the incision is made a little higher so as to provide better access to the superior thyroid pole.

ELEVATION OF THE FLAP- The skin, subcutaneous fat, and platysma are elevated as one layer. By applying upward traction, the upper flap is raised well above the thyroid notch by dissection in a relatively avascular plane with conventional cautery or ligasure vessel sealing system. Similarly, the lower flap is freed from the underlying fascia down to the level of the suprasternal notch.

FIG 4.2 FLAP ELEVATION

RETRACTION OF THE PRETHYROID MUSCLES- The fascia between the sternohyoid, omohyoid and sternothyroid muscles (strap muscles) is divided along the midline and the muscles retracted laterally. This is an avascular plane and care is taken not to injure small veins crossing between the anterior jugular veins. Both sternohyoid and sternothyroid muscles attached to the thyroid capsule are separated from the gland by blunt dissection.

MOBILIZATION OF THE GLAND - The mobilization of the thyroid gland involves the division of the middle thyroid vein so that the internal jugular vein and carotid artery can be retracted laterally and the thyroid displaced up and out of its bed. This gives access to the inferior aspect of the gland. The numbers of lateral veins are variable. Gentle upward and medial traction on

the gland places the lateral veins on the stretch so that by meticulous dissection they may be clamped and severed. The gland is rotated anteriorly and medially, the cleavage plane will be apparent, the internal jugular vein visualized and retracted laterally, and the remaining lateral veins severed.

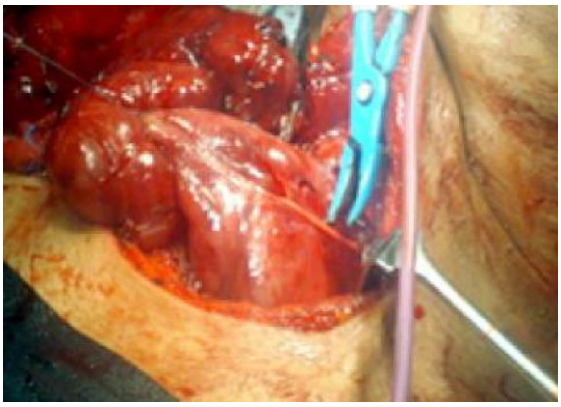


FIG 4.3 DISSECTION OF THE MIDDLE THYROID VEIN.

ISOLATION OF THE INFERIOR THYROID ARTERY- The most vulnerable location for injury to the recurrent laryngeal nerve is the point at which the inferior thyroid artery approaches the lateral aspect of the thyroid. Before entering the thyroid gland, the inferior thyroid artery may divide into one or more branches and be intermittently associated with the recurrent laryngeal nerve and its branches. For easy identification of the inferior thyroid artery and the recurrent laryngeal nerve, the entire

posterior lateral edge of the thyroid is exposed and this should be free of blood and blood stained tissue.

By meticulous scissors dissection in this avascular field, the inferior thyroid artery will be visualized coming from beneath the carotid artery, in most instances at the level of the mid portion of the thyroid gland. As the inferior thyroid artery is followed to the capsule of the gland, attention is directed to the recurrent laryngeal nerve; in most cases, this passes inferior to the artery, but it may be above or between the branches of the artery. To prevent damage to the recurrent laryngeal nerve, the inferior thyroid artery is not ligated until the nerve is isolated and out of the way. Then subcapsular ligation of the artery is done in continuity. Hemorrhage from a torn inferior thyroid artery is inexcusable. Obviously it cannot be controlled with pressure on the carotid artery. If this catastrophe occurs, the carotid sheath is retracted laterally and anteriorly and the proximal end of the artery clamped and ligated.

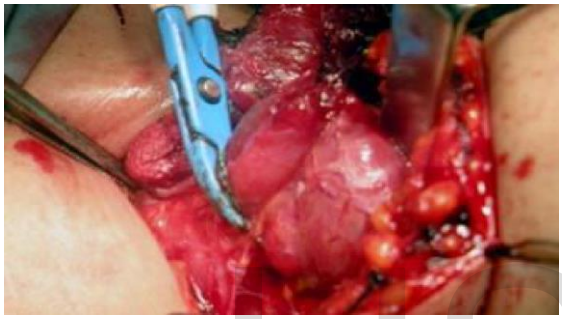


FIG 4.4 SEALING OF THE INFERIOR POLE WITH LIGASURE

ISOLATION OF THE RECURRENT LARYNGEAL NERVE- Most often the recurrent nerve is identified at the time the inferior thyroid artery is isolated. If not, it is sought low in the neck in its usual position in the groove between the esophagus and the trachea. As it approaches the lower border of the thyroid it may, as it ascends, turn as much as one cm, lateral to this groove and be intimately associated with a plexus of delicate inferior thyroid veins. Bleeding is avoided by meticulous scissors dissection; the scissors are always opened in the direction of the course of the nerve.

The recurrent laryngeal nerve may have one or more extralaryngeal branches. Only one, however, contains the motor fibers supplying the laryngeal muscles. From a practical point of view, all branches must be considered as possible motor branches and spared injury. Once identified, the nerve is followed to its junction with the inferior thyroid artery. The inferior thyroid artery is then ligated in continuity using vicryl 2-0 or ligasure is used to achieve hemostasis.

In our study, the number of surgeries where both RLN are identified and number of surgeries where one RLN is identified is noted.

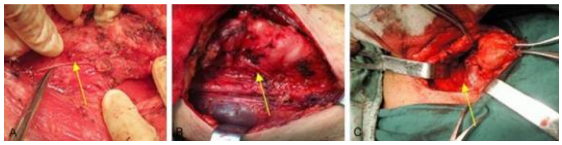


FIG 4.5 IDENTIFICATION OF RLN

MOBILIZATION OF THE INFERIOR POLE- With the inferior thyroid artery ligated and the recurrent nerve visualized, the lower pole is mobilized safely. The midline of the trachea is demonstrated below the isthmus. The entire plexus of vessels below the isthmus and inferior poles may be cross-clamped. The clamps are applied from the midline out.

DIVISION OF THE SUPERIOR THYROID VESSELS AND MOBILIZATION OF THE UPPER POLE - The superior thyroid vessels is ligated under direct vision using vicryl 2-0 or with ligasure. With high elevation of the prethyroid muscle and downward and inward traction of the superior pole, it is separated from the inferior constrictor muscle. The vessels are doubly ligated above and divided between the ligatures and a clamp placed below or ligature and division is done using ligasure.

FIG 4.6 LIGATION OF THE UPPER POLE OF THYROID LOBE WITH LIGASURE

IDENTIFICATION OF THE PARATHYROID- Every attempt is made to preserve at least one parathyroid on each side. No deliberate attempt is made to identify all the four parathyroids. The number of parathyroid glands identified are noted. As familiarity is gained with their appearance –split pea-sized, molded edges, tan to mahogany brown in color, appearing as distinct organs close to the thyroid capsule – they become more readily identified. Operative trauma or bruising of the parathyroids or adjacent lymphnodes may result in some capsular hemorrhage, staining the tissues so that the thyroid, parathyroid fat and lymphatic tissues are not clearly differentiated.

Once the superior pole is rotated downward and inward, the superior parathyroid may usually be seen at about the junction of the upper and middle thirds of the thyroid glands along its lateral posterior aspect.

The inferior parathyroids are usually found just below the junction of the inferior thyroid artery and the recurrent laryngeal nerves. Frequently a branch of the inferior thyroid artery leads to the inferior parathyroid.

DIVISION OF THE ISTHMUS- The isthmus is freed from its attachment to the trachea in the midline from below upward by blunt dissection. Care must be excised in separating the isthmus from the underlying pretracheal fascia to avoid puncture of the trachea by the sharp points of this straight clamp. At the upper aspect of the isthmus, the suspensory ligament is divided to complete the mobilization of the gland. Now the above steps are repeated in the opposite side to remove the entire gland.

CLOSURE OF THE WOUND- The head is slightly flexed to remove tension on the strap muscles. The prethyroid muscles are sutured with simple sutures in midline. After proper hemostasis, the wound is closed in layers. Skin is approximated with subcuticular suture or staplers.

As a routine the anaesthesiologist inspected the vocal cords following extubation. For first 12 hours, the patient is kept in propped up [FOWLER'S] position and liquid diet started after 6 hours or on the first post-operative day.

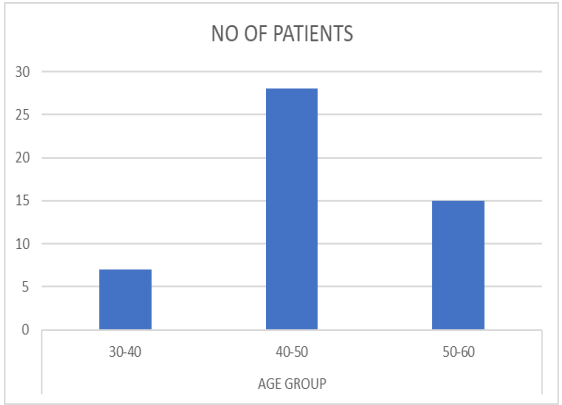
FIG 5.7 TOTAL THYROIDECTOMY SPECIMEN

OBSERVATION AND RESULTS

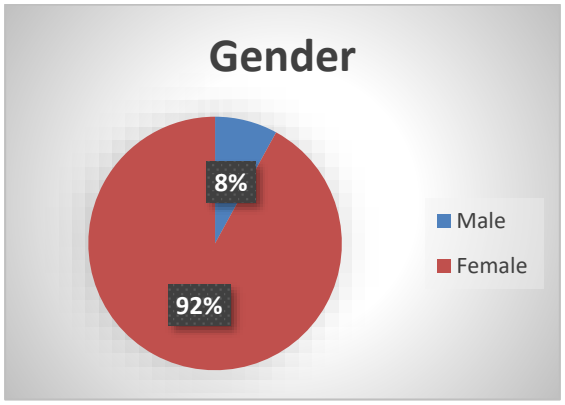
TABLE 1 : FREQUENCY OF METHOD OF DISSECTION

Method of Dissection		Frequency	Valid Percent
Valid	Conventional	30	60.0
	Ligasure	20	40.0
	Total	50	100.0

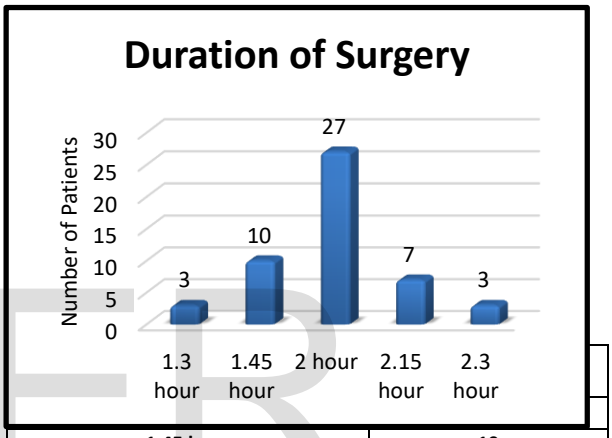
GRAPH 1: AGE DISTRIBUTION



GRAPH 2 : SEX DISTRIBUTION



GRAPH 3 : DURATION OF SURGERY



1.45 hour	10
2 hour	27
2.15 hour	7
2.3 hour	3

GRAPH 4 : METHOD OF DISSECTION

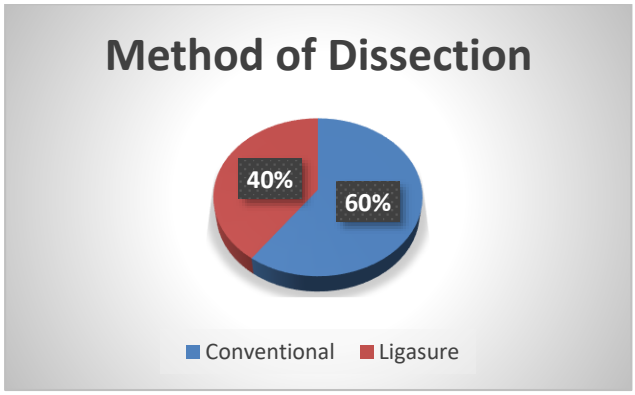
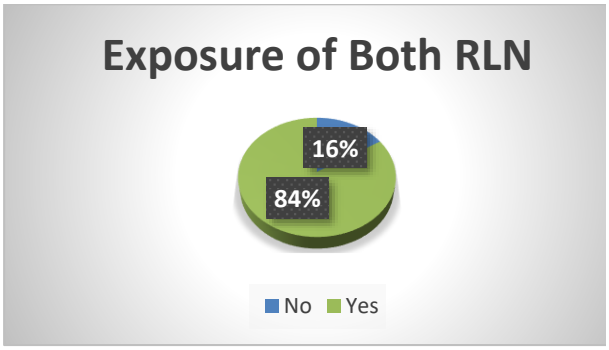


TABLE 3: FREQUENCY OF EXPOSURE OF BOTH RLN

Exposure Of Both RLN		Frequency	Valid Percent
Valid	No	8	16.0
	Yes	42	84.0
	Total	50	100.0

GRAPH 5 : FREQUENCY OF EXPOSURE OF BOTH RLN



GRAPH 6 : FREQUENCY OF IDENTIFICATION OF MORE THAN 3 PARATHYROID GLANDS

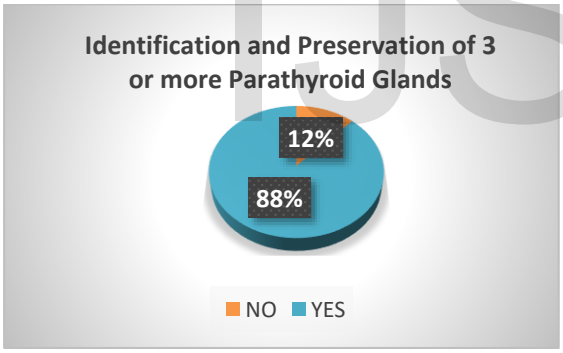
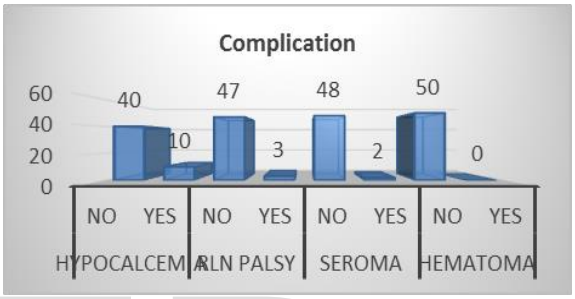


TABLE 4: FREQUENCY OF IDENTIFICATION AND PRESERVATION OF 3 OR MORE PARATHYROID GLANDS and TABLE 5: FREQENCY OF VARIOUS COMPLICATIONS

Identification and Preservation of 3 or more Parathyroid Glands		Frequency	Valid Percent
Valid	NO	6	12.0
	YES	44	88.0
	Total	50	100.0
VARIOUS COMPLICATIONS		Frequency	Valid Percent
HYPOCALCEMIA	NO	40	80.0
	YES	10	20.0
RLN PALSY	NO	47	94.0
	YES	3	6.0
SEROMA	NO	48	96.0
	YES	2	4.0
HEMATOMA	NO	50	100.0
	YES	0	0.0

GRAPH 7: FREQUENCY OF COMPLICATIONS



GRAPH 8: FREQUENCY OF DURATION OF SURGERY

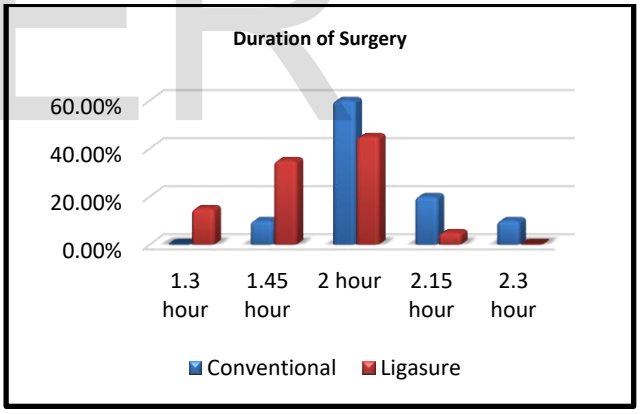


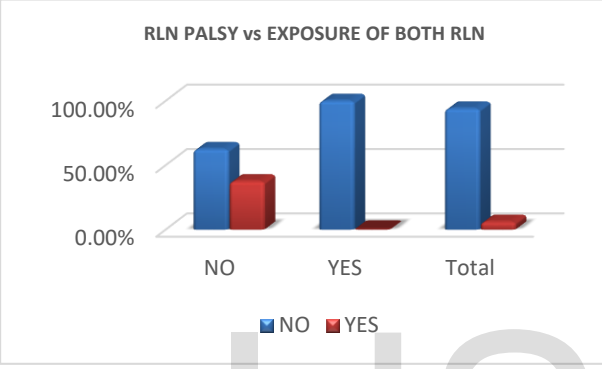
TABLE 6: DURATION OF SURGERY VS METHOD OF DISSECTION

		Method of ligation		Total	Chi square	p-value
		Conventional	Ligasure			
DURATION OF SURGERY	1.30	0	3	3	10.471	*0.003*
		0.0%	15.0%	6.0%		
	1.45	3	7	10		
		10.0%	35.0%	20.0%		
	2.00	18	9	27		

		60.0%	45.0%	54.0%		
	2.15	6	1	7		
		20.0%	5.0%	14.0%		
	2.30	3	0	3		
		10.0%	0.0%	6.0%		
	Mean Hours	2.00±1.7	1.73±0.32	-	3.57	*0.013*

P value is 0.013, which is statistically significant

GRAPH 9: EXPOSURE OF BOTH RLN VS RLN PALSY



		EXPOSURE OF BOTH RLN		Total	Chi square	p-value
		NO	YES			
RLN PALSY	NO	5	42	47	34.154	*0.023*
		62.5%	100.0%	94.0%		
	YES	3	0	3		
		37.5%	0.0%	6.0%		
Total		8	42	50		
		100.0%	100.0%	100.0%		

TABLE 7: RLN PALSY VS EXPOSURE OF BOTH RLN

P value is 0.023, which is statistically significant

TABLE 8: IDENTIFICATION AND PRESERVATION OF 3 OR MORE PARATHYROID GLANDS VS HYPOCALCEMIA

		HYPOCALCEMIA		Total	Chi square	p-value
		NO	YES			
IDENTIFICATION AND PRESERVATION	NO	1	5	6	17.093	*0.003*
		2.5%	50.0%	12.0%		
OF 3 OR MORE PARATHYROID GLANDS	YES	39	5	44		
		97.5%	50.0%	88.0%		
Total		40	10	50		
		100.0%	100.0%	100.0 %		

P value is 0.003, which is statistically significant

GRAPH 10 : IDENTIFICATION AND PRESERVATION OF 3 OR MORE PTG VS HYPOCALCEMIA

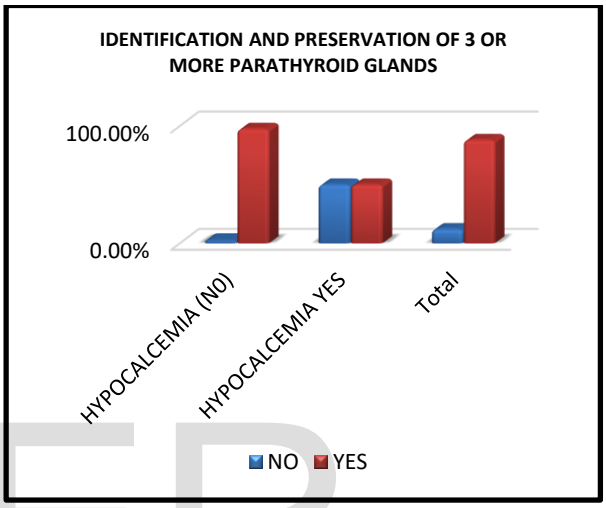
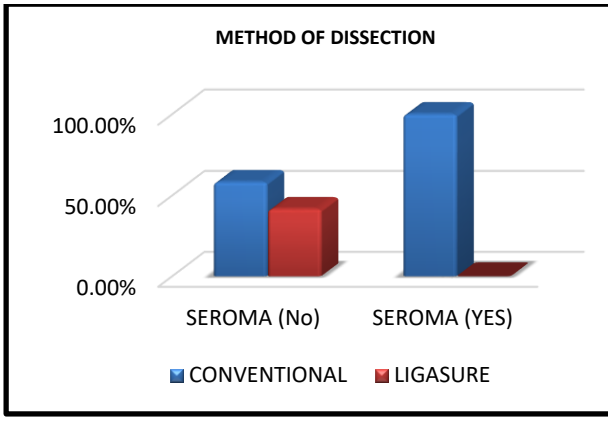


TABLE 9: METHOD OF DISSECTION VS SEROMA

		SEROMA		Total	Chi square	p-value
		NO	YES			
METHOD OF DISSECTION	CONVENTIONAL	28	2	30	2.889	0.08
		58.33%	100.0%	60.0%		
	LIGASURE	20	0	20		
		41.66%	0.0%	40.0%		
Total		48	2	50		
		100.0%	100.0%	100.0%		

GRAPH 11: METHOD OF DISSECTION VS SEROMA



GRAPH 12: DURATION OF SURGERY VS SEROMA

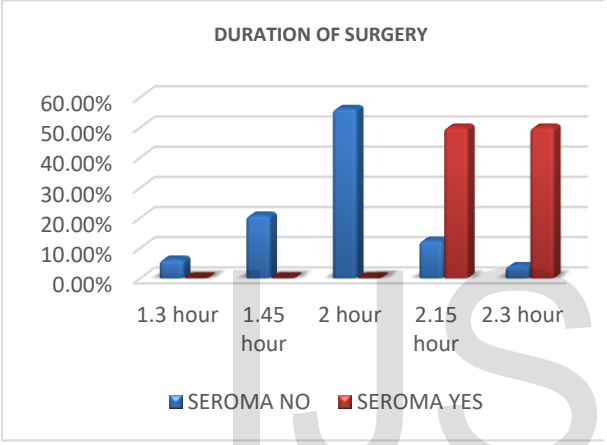


TABLE 10: DURATION OF SURGERY VS SEROMA

		SEROMA		Total	Chi square	p-value
		NO	YES			
DURATION OF SURGERY	1.30	3	0		9.301	0.052
		6.25%	0.0%	6.0%		
	1.45	10	0	10		
		20.83%	0.0%	20.0%		
	2.00	27	0	27		
		56.2%	0.0%	54.0%		
	2.15	6	1	7		
		12.5%	50.0%	14.0%		
	2.30	2	1	3		
		4.1%	50.0%	6.0%		
	Mean	2.01±1.4	1.87±1.09			
					2.447	0.077

DISCUSSION

Thyroid surgeries are one of the most commonly performed surgeries. Although the complication rates have decreased with better understanding of surgical techniques, it still exists and needs to be addressed for timely management. The present study makes an attempt to compare the intraoperative risk factors that leads to early postoperative complications in total thyroidectomy , thereby letting us prevent such occurences . The present study was conducted at ESIC Medical college and PGIMSR, Bengaluru over a period of 18 months.

In the present study, the number of female patients who underwent total thyroidectomy were 46 of the total 50 people and the rest were males, which accounts to 92% and 8% respectively[4,5]. Of the total patients, 54% belonged to the age group of 40-50 years, 30% to 30- 40 years and 14% to 50-60 years. For 27 patients, the duration of surgery were 2 hour , which accounts to 54 % of cases. The least duration of surgery was 1 hour 30 min for 6 % of cases and maximum duration of surgery was 2 hour 30 min which also accounted for 6% cases.

For 60% cases , the method of dissection was conventional using either monopolar or bipolar cautery and for 40% cases ligasure was used for dissection. In these 40% cases, the vascular pedicles were also ligated with ligasure. Both recurrent laryngeal nerve were exposed in 84% of cases while in 16% of cases only one nerve was exposed. It was due to the huge size of the gland, difficult dissection and difficult hemostasis. Identification of 3 or 4 parathyroid glands were done in 88 % of cases whereas only 1 or 2 glands were exposed in the rest 12%. No deliberate attempt was made to search and identify all the glands and it was left for surgeons preference and comfort.

Of all the complications studied , hypocalcemia was the most common complication occurring in about 20 percent of all cases. Transient RLN palsy was seen in 6% of all cases. Seroma was seen in 4% cases. Hematoma was not seen in any patient. In the present study, there was significant difference between the duration of the surgery by Conventional and Ligasure vessel sealing method. The mean duration of surgery was significantly higher in Conventional group as compared to the Ligasure group with a significant p value of 0.013. This result was in concordance with other studies which found significant operative time reduction with use of ligasure[6,7,8,9].

There was significant difference related to the RLN Palsy, with respect to the Exposure of both RLN. Of the 42 patients in whom both recurrent laryngeal nerves were identified and preserved, none of them developed transient paresis, while of the 8 patients in whom only 1 nerve was identified, 3 developed paresis. Thus, about 37.5% patients had

RLN palsy among the patients with no exposure of both RLN with a significant p value of 0.023. Yagnik et al had similar results with RLN palsy rates of 0 percent when both nerves were identified and 16% when only one nerve was identified[10].

Mechanisms of injury to the nerve include complete or partial transection, traction, or handling of the nerve, contusion, crush, burn, clamping, misplaced ligature, and compromised blood supply[11,12]. The American Thyroid Association 2015 guidelines strongly recommends visual identification of both RLN in all cases. A newer method for identification of RLN is Intraoperative nerve monitoring. IONM increases the identification rate of RLN, reduces the time of RLN identification and predicts the postoperative function of the vocal cords[13,14]. NCIONM is still the most common method of nerve monitoring, and CIONM is a recent surgical trend that could prevent RLN injury though real-time monitoring[15]. About 83.33% of the patients in whom less than 3 Parathyroid Glands were identified developed post-operative hypocalcaemia while only 11.4% of patients in whom 3 or 4 parathyroid glands were identified developed hypocalcemia. Pauly et al, reported similar results with incidence of hypocalcemia being 84% and 33% respectively in patients where 1 or 2 glands were identified when compared to 3 or 4 glands[16]. In the study by Siteges-Serra et al, the incidence of hypocalcemia when less than 3 PTG were identified and 3 or 4 PTG were identified were 52% and 30.5% respectively[17]. Pattou et al. prospectively evaluated the incidence and predictive factors of hypocalcemia in 1,071 consecutive patients. It was found that number of PTGs identified in situ during surgery was correlated with the outcome of hypocalcemia (P=0.010). Patients carried a high risk for permanent hypocalcemia if fewer than 3 PTGs were identified in situ during surgery[18].

In our study , seroma formation was seen only in 2 patients and both of them underwent dissection with conventional method using cautery. Hence , no significant statistical association could be found between seroma formation and method of dissection. Study by Ramouz et al showed that overall incidence of seroma formation in patients who underwent thyroidectomy by LigaSure™ Small Jaw was 2.2% while seroma incidence subsequent to conventional thyroidectomy has been reported to be approximately 5%[19].

Also, there was no association between the duration of surgery with the seroma formation.

CONCLUSION

Thus, in our study the most common complication was hypocalcemia >recurrent laryngeal nerve palsy > seroma. There was no hematoma formation in any patient. According to our study, the usage of Ligasure vessel sealing system decreases the duration of surgery significantly.

Similarly, identification and preservation of both RLN reduces the incidence of post-operative RLN palsy and identification and preservation of 3 or 4 parathyroid gland decreases the incidence of post -operative hypocalcemia when compared to identification of less than 3 glands.

There was no association between the duration of surgery or type of dissection with seroma formation.

SUMMARY

The purpose of this study is to determine the frequency of occurrence of unfavourable surgical outcomes like hypocalcemia, recurrent laryngeal nerve palsy, hematoma and seroma among patients undergoing total thyroidectomy and to assess the intraoperative risk factors for these unfavourable surgical outcomes.

The present study is a longitudinal study carried out among patients admitted in ESIMC PGIMSR, Rajajinagar,Bangalore-10. A total of 50 patients were taken for the study. The intraoperative risk factors assessed included Duration of surgery, Method of dissection (monopolar/bipolar cautery or ligasure vessel sealing system), Method of ligation of vascular pedicles (vicryl 2-0 suture or ligasure vessel sealing system), Exposure of both recurrent laryngeal nerve and Identification and preservation of 3 or 4 parathyroid glands.

The data was analyzed using Statistical Package for Social Science (SPSS) software and P-value of <0.05 was taken significant .

In the present study, the duration of the surgery was 2 hours for 54% of the total patients, followed by 1.45 hours for 20% of the total patients. About 60% patients had conventional method and 40% had ligasure method of Dissection. Exposure of Both RLN and Identification and Preservation of 3 or more Parathyroid Glands were done for 84.0% and 88.0% of the patients respectively.

A total of 20% had hypocalcaemia, 6% had RLN Palsy, 4% had Seroma and none of the patients had hematoma. There was significant difference between the duration of the surgery between the Conventional and Ligasure method. The mean duration of surgery was significantly higher in Conventional group as compared to the Ligasure group. There was significant difference related to the RLN Palsy, with respect to the Exposure of both RLN. About 37.5% patients had RLN palsy among the patients with no exposure of both RLN. About 83.33% of the patients with no Identification and Preservation of 3 or More Parathyroid Glands, developed post- operative hypocalcaemia.

REFERENCES

1.Rosto L, Avenia N, De Palma M, Gulino G, Nasi PG, Pezzulo L. Complications of total thyroidectomy; Incidence, prevention and treatment.Chir Ital. 2000;54(5):635 42.

2.Ozbas S, Kocak S, Aydintug S, Cakmak A, DEMIRKIRAN MA,WISHART GC. Comparison of the complications of subtotal, near total and total thyroidectomy in the surgical management of multinodular goitre. Endocrine journal.2005; 52(2):199-205.

3.Bergenfelz A, Jansson S, Kristoffersson A, Mårtensson H, Reihnér E, Wallin G, Lausen I. Complications to thyroid surgery: results as reported in a database from a multicenter audit comprising 3,660 patients. Langenbeck's Archives of Surgery. 2008 Sep 1;393(5):667-73

4. Li H, Li J. Thyroid disorders in women. Minerva medica. 2015 Feb 10;106(2):109-14.

5. Lu Y, Li J, Li J. Estrogen and thyroid diseases: an update. Minerva Medica. 2016 Aug 1;107(4):239-44.

6. Cakabay B, Sevinç MM, Gömceli I, Yenidogan E, Ulkü A, Koç S. LigaSure versus Clamp-and-Tie in Thyroidectomy: a Single-Center Experience. Adv Ther. 2009 ;26(11):1035-41

7. Saint Marc O1, Cogliandolo A, Piquard A, Famà F, Pidoto RR. LigaSure vs Clamp-and-Tie Technique to Achieve Hemostasis in Total Thyroidectomy for Benign Multinodular GoiterA Prospective Randomized Study. Arch Surg. 2007 Feb;142(2):150-6.

8. Yao HS, Wang Q, Wang WJ, Ruan CP. Prospective clinical trials of thyroidectomy with LigaSure vs conventional vessel ligation: a systematic review and meta-analysis. Arch Surg. 2009 Dec;144(12):1167-74. [13] Khafagy AH, ,Abdelnaby I .

9.Total thyroidectomy: Ligasure versus Clamp & Knot technique for intraoperative hemostasis. Egyptian Journal of Ear, Nose, Throat and Allied Sciences. 2013, 14 (2): 59–65

10. V Yagnik, M Mehta. Incidence Of Recurrent Laryngeal Nerve Palsy With And Without Nerve Identification During Thyroid Surgery. The Internet Journal of Surgery. 2008 Volume 20 Number 1.

11. 24. Steurer M, Passler C, Denk DM, Schneider B, Niederle B, Bigenzahn W. Advantages of recurrent laryngeal nerve identification in thyroidectomy and parathyroidectomy and the importance of preoperative and postoperative laryngoscopic examination in more than 1000 nerves at risk. Laryngoscope 2002. Jan;112(1):124-133

12. Rice DH, Cone-Wesson B. Intraoperative recurrent laryngeal nerve monitoring. Otolaryngol Head Neck Surg 1991. Sep;105(3):372-375

13. Anuwong A, Lavazza M, Kim HY, Wu CW, Rausei S, Pappalardo V, Ferrari CC, Inversini D, Leotta A, Biondi A, Chiang FY. Recurrent laryngeal nerve management in thyroid surgery: consequences of routine visualization, application of intermittent, standardized and continuous nerve monitoring. Updates in surgery. 2016 Dec 1;68(4):331-41.

14. Hei H, Zhai Y, Qin J, Song Y. Intermittent intraoperative neural monitoring technology in minimally invasive video-assisted thyroidectomy: a preliminary study. Journal of Investigative Surgery. 2016 Mar 3;29(2):93-7.

15. Bai B, Chen W. Protective effects of intraoperative nerve monitoring (IONM) for recurrent laryngeal nerve injury in thyroidectomy: meta-analysis. Scientific reports. 2018 May 17;8(1):1-1.

16. Pauly TJ, Santhosh PV, Santhosh TV, Vinodh M. A retrospective study on the incidence of hypocalcemia and number of parathyroid glands identified and preserved during thyroid surgeries. Int J Res Med Sci. 2016 Nov;4(11):4848-51.

17. Sitges-Serra A, Gallego-Otaegui L, Suárez S, Lorente-Poch L, Munné A, Sancho JJ. Inadvertent parathyroidectomy during total thyroidectomy and central neck dissection for papillary thyroid carcinoma. Surgery. 2017 Mar 1;161(3):712-9.

18. Pattou F, Combemale F, Fabre S, et al. Hypocalcemia following thyroid surgery: incidence and prediction of outcome. World J Surg 1998;22:718-24.

19. Ramouz A, Rasihashemi SZ, Daghigh F, Faraji E, Rouhani S. Predisposing factors for seroma formation in patients undergoing thyroidectomy: Cross-sectional study. Annals of medicine and surgery. 2017 Nov 1;23:8-12