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Original Article

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Comparison of two different techniques used for thyroidectomies; Conventional thyroidectomy vs. LigaSure

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ABSTRACT

BACKGROUND & OBJECTIVES: Certain interventions have been carried out to reduce blood loss during thyroidectomy to a great extent. The study aims to compare the efficacy of LigaSure thyroidectomy with conventional thyroidectomy.
METHODOLOGY: A quasi experimental study was conducted at Aziz Fatimah Hospital, Faisalabad, and 58 patients were divided into two groups. Group A underwent conventional thyroidectomy and Group B LigaSure thyroidectomy. Preoperative and postoperative variables were recorded and analyzed in SPSS 21. An Independent t-test was used to compare the mean difference between the two groups. A p-value less than 0.05 was considered statistically significant.
RESULTS: A total of 58 patients were enrolled in the study and divided into two groups. The mean age of patients in group A undergoing conventional thyroidectomy was (43.1±9.23) and in group B was (41.23±9.23) with p-value=0.4419 (non significant result was found among the age groups) . Mean operative time calculated for LigaSure-assisted hemithyroidectomy (28.57±3.45) minutes , subtotal thyroidectomy (43.33±2.86) minutes, and total thyroidectomy (73.15±9) minutes were significantly lower than those undergoing conventional thyroidectomies 40.12±6.5 minutes , 66.25±6.29 minutes , 87.35±7.02 minutes respectively. The mean difference in mean operative time and number of sutures used in both techniques were statistically significant ($p \leq 0.05$).
CONCLUSION: Less mean operative time and suture ligations have increased the surgeon's compliance toward the device. These devices are now the first choice for physicians and surgeons for thyroidectomies not only in Pakistan but also across the globe.
KEYWORDS: Conventional thyroidectomy, LigaSure thyroidectomy,Surgical procedure.

INTRODUCTION

The thyroid is one of the most vascular endocrine organs entangled in many vessels such as superior thyroid arteries and veins along with tracheal and esophageal branches extending to the complete architecture of the gland [1]. With such an extensive blood supply, thyroidectomy becomes the most challenging surgical procedure in terms of securing hemostasis. Safe thyroid medical procedure requires fastidious hemostasis and cautious control of dying[2]. Total thyroidectomy is considered one of the most popular and gold-standard surgical procedures nowadays for the enlarged thyroid gland[3]. In recent times, the latest interventions have been done to cope with this hemostatic challenge. One of the wonders discovered lately are devices that instantly secure hemostasis during such arcane procedures reducing the bleeding time and surgery time. Various strategies are implied and utilized to secure hemostasis such as ligation and stitching (using ligatures and sutures), Bipolars and Monopolar for Coagulation, ultrasonic coagulation, and electro-ligation fixing (LigaSure Vessel sealing system). After the latest interventions, the complication rates have been reduced to less than 1% [4].

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In recent times, the LigaSure Vessel sealing system has gained immense popularity among the surgeons of Pakistan. A bipolar electrosurgical gadget that coagulates the vessels up to 7mm breadth. The electrosurgical gadget instantly seals the vessels and diminishes the risk of bleeding to a much greater extent. Literature evidence suggests a significantly lower operative time for thyroidectomy using the LigaSure Device[5]. There must be opposing views in comparative studies, if already Ligasure role is established with all the benefits stated , why comparison was done

In our study, we aim to explore the pros and cons of LigaSure thyroidectomy with conventional thyroidectomy by comparing both surgical procedures and their per-operative and post-operative findings.

METHODOLOGY

The study was approved by the institutional ethical committee under letter number DME/1085-20. A quasi experimental study was designed in the Department of Surgery, Aziz Fatimah Hospital, Faisalabad, Pakistan to assess the efficacy and postoperative outcomes of two different methods of thyroidectomy. The study comprised 58 patients who underwent total, subtotal thyroidectomy, and hemithyroidectomy from April 01, 2020 to January 15, 2022. The patients enrolled in the study were explained the protocols of the study and informed consent was taken. Patients suffering from uncontrolled diabetes, hypertension, retrosternal goiter or those who underwent lobectomy, neck dissections, and secondary thyroid operations were excluded. The study was single-blind as the patients were unaware of the surgical intervention. The patients were randomized into two groups based on the coding system used in the computer. All the patients were admitted one day before the surgery and necessary work up was done screening tests were performed on the patients visiting daily in the outdoor unit.

Patients in both groups were further divided into subgroups depending upon the extent of operation; Hemithyroidectomy, Subtotal, and total thyroidectomy. Peroperative variables such as bleeding time and length of operation and postoperative variables such as length of hospital stay and postoperative complications were recorded. After intubation and general anesthesia, the patient is placed in a supine position by extending the neck by placing a support or cushion beneath the neck and shoulder. The table is tilted 20 degrees head up to aid the emptying of the neck veins.

The skin is prepped from the chin to the upper thorax. After aseptic measures, a skin collar incision 2-3cm above the sternal notch is given. Skin flaps are raised using cautery or bipolar. The strap muscles are then separated to allow retraction. The enlarged thyroid gland is identified along with recurrent laryngeal nerve and parathyroid glands. The latter two are preserved and the terminal branches of the inferior thyroid artery are ligated. The superior pole and the inferior pole are ligated with the suture in conventional thyroidectomy. The thyroid gland is then mobilized and removed. However, In LigaSure thyroidectomy, Superior and inferior pedicles were sealed with LigaSure and Thyroid when removed from the tracheal bed, used to seal the accessory vessels and secure homeostasis.

A follow-up of 3 months was conducted by outdoor patient visits and telephonic conversations. The collected data were recorded in excel and analyzed in SPSS 21 using an independent t-test for continuous variables. Descriptive statistics were applied and reported as mean±SD. A p-value of less than 0.05 was considered significant while less than 0.005 was highly significant.

RESULTS

Our study comprised of a total 58 patients, divided into two groups containing 29 participants each. Table-I indicates the distribution of age groups and gender along with the indication of the operation. The mean age in group A was calculated as 43.1±9.16 years and 41.23±9.23 years in group B, with p-value=0.4419 no statistical difference was found among the age groups. However, the majority of participants in the study were female. Figure-I indicates the gender distribution in each group.

The mean operative time was calculated and recorded in minutes with the help of a stopwatch. Table-II indicates the mean operative time for both surgical procedures. Out of 29 patients undergoing conventional thyroidectomy 8 patients underwent Hemithyoidectomy, 4 Subtotal, and 17 were operated on for total thyroidectomy. Contrary to that, 7 patients underwent hemithyroidectomy, 3 subtotal thyroidectomies, and 19 total thyroidectomies in the group of LigaSure thyroidectomies. The mean and SD were calculated and mentioned in table-II. p-value was considered highly significant p≤0.005.

Table-I: Demographics of the participants.

Variables		Group-A n(%) Conventional thyroidectomy	Group-B n(%) Ligasure Thyroidectomy
Age	20-30	1(3.4)	4(13.8)
	31-40	13(44.8)	11(37.9)
	41-50	6(20.7)	7(24.1)
	51-60	9(31.0)	7(24.1)
	Mean±SD	43.1 ± 9.16	41.23 ± 9.23
Indication for Operation	Multinodular goiter	17(58.6)	21(72.4)
	Graves Disease	5(17.2)	3(10.3)
	Malignancy	7(24.1)	5(17.2)

LigaSure devices provide a vessel sealing system that doesn't compel the surgeon to use sutures as they are implied in the conventional thyroidectomy. Table-III indicates the comparison of several sutures being used in both surgical interventions.

Table-IV indicates the presence of postoperative complications among the participants of both groups.

Table-II: Mean operative time for both groups.

Mean Operative time	n	Group A Conventional thyroidectomy	n	Group B Ligasure Thyroidectomy	p-value
Hemithyroidectomy	8	40.12 ± 6.5	7	28.57 ± 3.45	≤0.001
Subtotal thyroidectomy	4	66.25 ± 6.29	3	43.33 ± 2.866	0.002
Total thyroidectomy	17	87.35 ± 7.02	19	73.15 ± 9	≤0.001

Table-III: Number of suture ligations according to extent of operation.

Mean Operative time	n	Group A Conventional thyroidectomy	n	Group B Ligasure Thyroidectomy	p-value
Hemithyroidectomy	8	2.65 ± 051	7	1.28 ± 0.487	≤0.001
Subtotal thyroidectomy	4	4.75 ± 0.5	3	1.66 ± 0.5	≤0.001
Total thyroidectomy	17	5.47 ± 051	19	1.84 ± 0.688	≤0.001

Table-IV: Complications & post-operative stay.

Variables	Group A Conventional thyroidectomy	Group B Ligasure Thyroidectomy
Seroma	0	0
Hemorrhage	0	0
Wound infection/Sepsis	1	0
Recurrent laryngeal nerve palsy	1	0
Transient Hypocalcemia	2	1
Hospital Stay	2-4 Days	2-3 Days

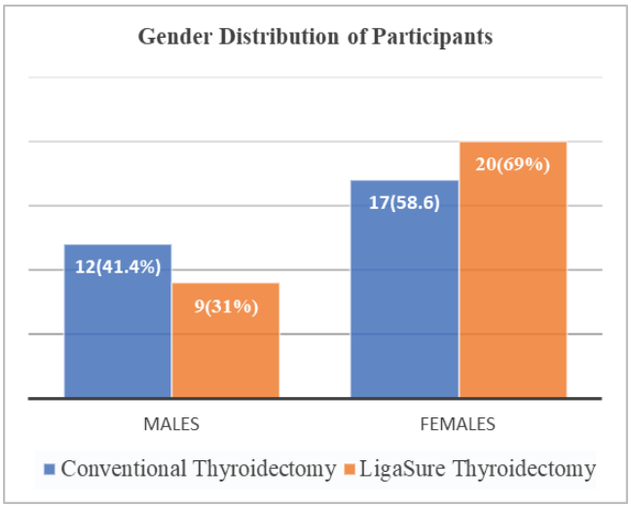

Figure-I: Gender distribution of participants.

DISCUSSION

The thyroid gland is one of the most vascular glands, which makes it challenging for surgeons to operate. The patients were divided into two groups, with group A undergoing conventional thyroidectomy and group B undergoing LigaSure thyroidectomy. No statistical significance was noted in our study. Likewise, a study conducted by Ahmad et al. also reported the non-significance of age and gender between two groups[6].

The majority of the population to undergo thyroidectomy was with multinodular goiter, as 17 and 21 patients from both groups underwent thyroidectomy of either type. Another study also indicated multinodular goiter (MNG) as one of the commonest indications for thyroidectomy[1].

In our study, the mean operative time for each type of thyroidectomy was less in the LigaSure group. In group B, the mean operative time was 28.57±3.45 minutes for hemithyroidectomy, 43.33±2.866 minutes in subtotal thyroidectomy, and 73.15±9 minutes in total thyroidectomy. In contrast, the mean operative time in group A with conventional thyroidectomy were 40.12±6.5 minutes, 66.25±6.29 minutes, and 87.35±7.02 minutes was reported respectively.

Moreover, another study conducted by Ciftci advocated the efficacy of harmonic focus (electrosurgical gadget with vessel sealing capacity, likewise LigaSure). The use of such devices has added the advantage of higher efficacy with shorter operative time, enabling simultaneous cutting and coagulation [7]. Another study stated a shorter operative time using LigaSure devices during thyroidectomies [8].

A study published also concluded a reduced operative time in LiagSure thyroidectomies with a p-value less than 0.01 labeled as highly significant. According to a study, a shorter operative time with reduced intraoperative blood loss was reported as compared to conventional procedures [9].

Our study stated that the length of hospital stay was also significantly less in patients undergoing LigaSure thyroidectomy than the conventional thyroidectomy. However, the study conducted in the Zhejiang Provincial Center Stated no significant difference between the postoperative complications and length of hospital stay [10].

The incidence of postoperative complications is certainly low in our study as there was only one patient with wound sepsis treated with prior high-spectrum antibiotics. Hypocalcemia was treated with the proper administration of Calcium to avoid hypocalcemic tetany. The incidence of transient nerve injury is low as it is highly dependent on careful dissection. According to the literature review, the incidence was as low as 0.9% in the LigaSure group and 1.9% in the conventional groups [11]. Likewise, a randomized controlled stated very rare percentages of patients with hematoma or seroma formation post thyroidectomy[1].

Thyroidectomies done with LigaSure are proven to be more effective than the conventional method. A significantly reduced operative time and hospital stay and a number of stuture have been noted with LigaSure thyroidectomy.

CONCLUSION

LigaSure devices have certainly revolutionized the approach and enhanced the efficacy of surgical intervention with less mean operative time, hospital stay, and postoperative complications. These added advantages of LigaSure thyroidectomies have replaced the conventional thyroidectomies nowadays.

LIMITATIONS: The study is a single-centered study with a limited population. However, a study comprising of a larger population must be devised for a better and definitive result.

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Author's Contribution:

Sarwat Bibi: Substantial contributions to the conception and design of the work.
Sumara Tabassam: Acquisition, analysis, and interpretation of data for the work.
Sultan Mahmood: Drafting the work and reviewing it critically for important intellectual content.
Khurram Saqib: Design of the work.
Muhammad Hamza Rana: Interpretation of data for the work.
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