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ORIGINAL ARTICLE

Comparison of Ligasure versus conventional technique for total thyroidectomy.

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ABSTRACT… Objective: To compare thyroidectomy by Ligasure™ with conventional technique in terms of mean intra operative blood loss. **Study Design:** Randomized Control Trial. **Setting:** Surgical Unit-I, Allied Hospital Faisalabad. **Period:** August 2018 to April 2019. **Material & Methods:** All the patients were admitted through out-patient department. Informed consent was taken. The patients were counseled on expected outcome particularly on cosmesis and possible complications, especially the expectant management of seroma. Clinical examination was done to confirm the diagnosis. Preoperative investigation was carried out in the ward. Patients were divided in 2 groups by lottery method. Group A included patients in which total thyroidectomy was done using Ligasure vessel sealing system. Group B included patients in which total thyroidectomy was done using conventional thread ligation technique. All patients were given general anesthesia. Patients in each group had surgery by respective method. Intraoperative blood loss was measured by weighing the dry gauze preoperatively and soaked gauze post operatively. Difference in weight was given estimated blood loss that was recorded in milliliters. **Results:** In our study, out of 70 cases, 42.86%(n=15) in Group-A and 34.29%(n=12) in Group-B were between 18-50 years of age whereas 57.14%(n=20) in Group-A and 65.71%(n=23) in Group-B were between 51-70 years of age, mean+sd was calculated as 50.86+7.94 years in Group-A and 53.26+6.57 years in Group-B, 34.29%(n=12) in Group-A and 28.57%(n=10) in Group-B were male whereas 65.71%(n=23) in Group-A and 71.43%(n=25) in Group-B were females, comparison of thyroidectomy by Ligasure™ with conventional technique in terms of mean intra operative blood loss shows that 61.31+4.37 ml in Group-A and 72.11+3.83 ml in Group-B, p value was 0.0001. **Conclusion:** We concluded that Ligasure™ is significantly better when compared with conventional technique during thyroidectomy in terms of mean intra operative blood loss.

Key words: Conventional Technique, Intraoperative Blood Loss, Ligasure, Thyroidectomy.

INTRODUCTION

Thyroid surgery dates back to 952 AD, when Albucasis was the first to conduct the procedure. Following that, the surgery's progress had its ups and downs. Previously, doctors hesitated to undertake this procedure because of the complications. However, later on, surgeons like as Billroth and Kocher breathed fresh life into the operation, which led to it being popular and undergoing several modifications to where it is now. The search for the ideal method is still ongoing.[1]

There have been notable improvements in the way that thyroid surgery is performed and the complication rate with this procedure. The primary goal of thyroid surgery is to minimize intraoperative bleeding, keep the surgeon's field of view as clear as possible, and prevent damage to parathyroid glands and laryngeal nerves. The most frequent kind of bleeding is caused by injury to thyroid arteries and thyroid parenchymal hemorrhage, which may occur either before or after surgery.[2] Bleeding during thyroid surgery can obscure the operating area, making safe dissection of the recurrent laryngeal nerve and parathyroid gland difficult and increase the duration of procedure. The thyroid gland has one of the greatest blood supplies of any organ, with many blood vessels and plexuses accessing its parenchyma. Thyroid surgery entails thorough devascularization of the thyroid

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gland. As a result, while separating the different arteries before excising the gland, hemostasis is critical. Suture knot tying technique or modern vascular hemostasis techniques like ligasure as an alternative bipolar surgical diathermy system can produce effective vessel haemostasis.[3]

Sutures, as well as the method for applying them, need practice and a significant learning curve. Total thyroidectomy using LigaSure, a device that seals, ligates, sections, and dissects the thyroid, can be a quick and painless option.[4] Suture less thyroid surgery, employing devices such as the LigaSure® Precise (Covidien, Boulder, CO, USA), has grown in popularity over the last decade. This approach has been demonstrated to be as successful, safe, and quick as Kocher's "cut-and-tie" technique, with perioperative morbidities equivalent to Kocher's "cut-and-tie" technique.[5] For "sealing" medium-sized vessels, electrothermal bipolar vessel sealing (LigaSure) has shown to be both safe and effective.[6]

With the introduction of novel energy instruments such as ultrasonic coagulation (Harmonic Scalpel, Ethicon) and bipolar energy (LigaSure, Valleylab) for cutting and hemostasis, new ways of vascular ligation and division have been introduced without increasing the risk of postoperative problems.[7] In recent years, new vessel sealing techniques have been used in thyroid surgery, including electrothermal bipolar activated devices [such as LigaSure® (LS)] and ultrasonic systems [such as UltraCision® or Harmonic Focus® devices (HS)].

The goal was to cut down on blood loss, surgery time, and skin incision length. The LS annihilate the lumen by forming a seal by changing the vessel wall structure with a mix of pressure and electrothermal energy.[8] In one study thyroidectomy using ligasure revealed decreased intra-operative blood loss (62.06ml +/- 7.34), compared to conventional thread ligation technique (75.84ml +/- 9.21) that revealed increased intra-operative blood loss.[2] The purpose of this study is to compare the total thyroidectomy using Ligasure vessel sealing system in comparison with conventional thread ligation method in terms of mean intra-operative blood loss so that ligasure could be adopted in our local settings with confidence and mobility related to blood loss could be prevented.

MATERIAL & METHODS

This Randomized control trial was conducted on Surgical Unit I Allied Hospital Faisalabad for 6 months from 13 10-2018 to 12-04-2019. The sample size was calculated by using WHO sample size calculator for 2 mean anticipated population mean = 75.84[2] test value of population mean 62.06[2] pooled standard deviation = 8.33 the power of study was = 90% with level of significance 5% the sample size = 70 (35 in each group).

Inclusion Criteria

- Male and female patients of clinically diagnosed multinodular goiter and euthyroid both clinically and biochemically between the ages 18 years to 70 years undergoing thyroidectomy.

Exclusion Criteria

- History of previous thyroid surgery.
- Preoperative diagnosis of thyroid cancer.
- Retrosternal goiter.
- Solitary thyroid nodule.
- Patients of diagnosed bleeding disorders.
- Patients of uncontrolled diabetes and hypertension.

All the patients were admitted through out-patient department. Informed consent was taken. The patients were counseled on expected outcome particularly on cosmesis and possible complications, especially the expectant management of seroma. Clinical examination was done to confirm the diagnosis. Preoperative investigation was carried out in the ward. Patients were divided in 2 groups by lottery method. Group A included patients in which total thyroidectomy was done using Ligasure vessel sealing system. Group B included patients in which total thyroidectomy was done using conventional thread ligation technique. All patients were given general anesthesia. Patients in each group had surgery by respective method. Intraoperative blood loss was measured by weighing the dry

gauze preoperatively and soaked gauze post operatively. Difference in weight was given estimated blood loss that was recorded in milliliters.
All the data was entered and analyzed by using SPSS V-26.

RESULTS

The total number of patients included in the study was 60. Mean Age in Group A was 50.86+7.94 years with 42.86% (n=15) were between 18-50 years and 57.14% (n=20) were between 51-70 years. While in Group B mean age was 53.26+6.57 years with 34.29% (n=12) were between 18-50 years and 65.71% (n=23) were between 51-70 years (Table-I).

In terms of gender, 34.29% (n=12) and 28.57% (n=10) were male in Group A and Group B respectively. (Table-II)

In terms of mean intra operative blood loss there was 61.31+4.37 ml in Group-A and 72.11+3.83 ml in Group-B, p value was 0.0001. (Table-III)

Age (in years)	Group-A (n=35)	Group-B (n=35)
	No. of Patients (%)	No. of Patients (%)
18-50	15 (42.86%)	12 (34.29%)
51-70	20 (57.14%)	23 (65.71%)
Total	35 (100%)	35 (100%)
Mean±SD	50.86±7.94	53.26±6.57

Table-I. Age distribution (n=70)

Gender	Group-A (n=35)	Group-B (n=35)
	No. of Patients (%)	No. of Patients (%)
Male	12 (34.29%)	10 (28.57%)
Female	23 (65.71%)	25 (71.43%)
Total	35 (100%)	35 (100%)

Table-II. Gender distribution (n=70)

Intra Operative Blood Loss (ml)	Group-A (n=35)		Group-B (n=35)	
	Mean	SD	Mean	SD
	61.31	4.37	72.11	3.83
P value	0.0001			

Table-III. Mean intra operative blood loss (n=70)

DISCUSSION

Even in benign diseases, total thyroidectomy is now regularly done, resulting in a significant increase in the number of surgeries performed. The standardization of technique has reduced the number of problems to a bare minimum. Several new devices have been created and utilized in both open and laparoscopic surgery in recent years. In circumstances where Harmonic Scalpel is difficult to use, Ligasure allows for dissection. It can also seal blood vessels up to 3 mm in diameter with 2 mm of thermal damage, whereas Harmonic Scalpel can seal vessels up to 7 mm in diameter with 2 mm of thermal damage.

The rationale of this study was to compare the total thyroidectomy using Ligasure vessel sealing system in comparison with conventional thread ligation method in terms of mean intra-operative blood loss so that ligasure could be adopted in our local settings with confidence and mobility related to blood loss could be prevented.

In our study, mean intra operative blood loss was 61.31+4.37 ml in Group-A and 72.11+3.83 ml in Group-B, p value was 0.0001.

Our findings are comparable with a study where thyroidectomy using ligasure revealed decreased intra-operative blood loss (62.06 +/- 7.34ml), compared to conventional thread ligation technique (75.84 +/- 9.21ml) that revealed increased intra-operative blood loss.[2]

There was observed to be a significant difference in the distribution of variance between the two groups, meaning that reduced chances of parathyroid gland and laryngeal nerve damage exist when using ligature than when using a clamp and tie. When Ignjatovi and Kosti[10] investigated this, they discovered that the duration of surgery in the ligasure group was much shorter than patients who had a conventional ligature, and that there were less complications than in patients who had the traditional surgical thyroidectomy technique. In contrast to that, Schiphorst et al.[11] found that there were no significant differences in complications, and the overall median surgery time was significantly shorter in the ligasure group. The researchers Macario et al.[12] found that in a meta-analysis of the results of 29

randomized trials, a system of electric bipolar thermal sealing (EBVS-Ligasure) had a reduced mean operating time of 28 percent compared to suture ligation/electrocauterization or ultrasonic energy (Harmonic Scalpel). Ligasure significantly decreased blood loss, fewer problems, and a 2.8-unit reduction in postoperative discomfort was also discovered in the research.

Ashkenazi D and others[13] described the advantages and disadvantages in the use of Ligasure in the light of their experience and in the literature, they concluded that the use of Ligasure is effective in the prevention of operative bleeding in thyroid surgery, and it does not prolong the operative time nor raise the rate of complications. In comparison with other sealing methods we found Ligasure to be the most effective. However, cost of ligasure is of concern. They recommended the use of Ligasure in thyroid surgery.

In light of the above discussion, the hypothesis of this study "Total thyroidectomy using Ligasure is better than conventional thread ligation method in terms of intraoperative blood loss" is justified.

CONCLUSION

We concluded that in terms of mean intraoperative blood loss, Ligasure™ is considerably superior than the traditional method during thyroidectomy, according to our findings.

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