

Research Article

Analysis of total thyroidectomy with ligasure small jaw device versus conventional vascular ligature technique

**Muhammad Aqil Razzaq¹, Muhammad Waseem Anwar²
and Amna Shahab³**

¹Associate Prof. of General Surgery, Central Park Medical College, Lahore

^{2,3}Assistant Prof. of General Surgery, CMH Lahore Medical College, Lahore

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ABSTRACT

Introduction: Total thyroidectomy has been considered to be a treatment of choice for thyroid malignancies. It has recently gained popularity as gold standard for benign thyroid disorders requiring surgical treatment. There are various techniques to deal with the blood vessels and achieve hemostasis.

Objectives of the study: The main objective of the study was to analyse the benefits of using ligasure small jaw device versus conventional vascular ligature technique while performing total thyroidectomy.

Material and methods: This clinical study was conducted in the department of surgery Central Park Medical College during the period of January 2018 to June 2019. This study was conducted after approval from the ethical committee of hospital. All patients with diagnosis of multinodular goiter, thyroid cancers, retrosternal goiter, and other indications for thyroid surgeries were enrolled. Patients who had undergone neck surgeries were excluded from the study.

Results: The total number of patients included in the study was 102 (n=102). Number of female patients was 45 (88.2%) and 41 (80.3%) in groups A and B, respectively. In group A frequency of male patients was 9 (17.6%) and in group B it was 7 (13.7%). The mean age of the patients undergoing surgery was 41.7 ± 7.1 (group A) and 39.4 ± 6.7 (group B). The main outcome measures compared were intra operative bleeding, parathyroid injury and operative time. **Conclusion:** It is concluded that ligaSure was significantly advantageous over conventional technique in reducing operation time as well as perioperative and postoperative blood loss and parathyroid injury.

Keywords: thyroidectomy, ligasure small jaw device, conventional vascular ligature technique

INTRODUCTION

Total thyroidectomy is the treatment of choice for thyroid malignancies and recently it has gained popularity as gold standard for benign thyroid disorders requiring surgical treatment. According to American Thyroid Association approximately 150,000 patients undergo

thyroidectomy every year in the United States for benign or malignant disease. Transient hypocalcemia and recurrent laryngeal nerve (RLN) injury are the most commonly reported complications (5%-15%)¹.

Despite major developments in the technique total thyroidectomy is still considered an adventurous endeavour because of the higher complication rate. Most important improvements in thyroid surgery include laparoscopic thyroidectomy, energy based devices (EBD) like Harmonic Focus® (Ethicon by Johnson & Johnson) and LigaSure® (Medtronic) for dissection and hemostasis, intraoperative neuromonitoring, and parathyroid hormone (PTH) assay technology². Better hemostasis allows for early removal of drain and decreased hospital stay. Some authors do consider the increased healthcare costs associated with use of EBDs to be somewhat of a disadvantage³.

Through its anatomical position, the thyroid gland has a rich blood supply, both arterial and venous, with close proximity to the main laterocervical vessels (carotid artery, jugular vein). Prompt and effective hemostasis is crucial in thyroid surgery, but ligation of blood vessels is often time consuming⁴. The use of sutures and their application technique require experience and a prolonged learning curve. Performing total thyroidectomy by using sealing, ligation, section and dissection devices, as LigaSure Small Jaw, in our opinion can be a rapid and elegant alternative technique⁵. This device allows effective hemostasis for blood vessels with diameters up to 7 mm. The possibility of dissection and removal of the thyroid gland from the tracheal support, sparing the laryngeal nerves and parathyroid glands and the surrounding heat dispersion being much smaller (1 mm) compared with the use of monopolar electrocautery, make the use of this type of instrument ideal for performing total thyroidectomy⁶.

Objectives of the study

The main objective of the study was to analyse the benefits of performing total thyroidectomy with ligasure small jaw device versus conventional vascular ligature technique.

MATERIAL AND METHODS

This clinical study was conducted in the department of surgery Central Park Medical

College during the period of January 2018 to June 2019. Prior approval was taken from the ethical committee of the hospital. All adult patients of both gender with diagnosis of multinodular goiter, thyroid cancer, retrosternal goiter, and other indications for thyroid surgeries were enrolled. Patients who had undergone previous neck surgeries were excluded.

Data collection

The data was collected from 102 patients. Informed consent was taken from the patients and they were randomly allocated into two groups Group A employed Ligasure technique and Group B Conventional suture technique Demographic data, including patients' age, gender, body mass index (BMI), postoperative histopathology were recorded. All patients underwent preoperative physical examination and laboratory tests including total and ionized calcium level, prior to surgery. During postoperative admission, patients were examined to determine symptomatic hypocalcemia. Total and ionized calcium levels measured were 24–48 hrs postoperatively and 2 weeks after surgery. Intraoperative blood loss was calculated meticulously with due attention to suction canisters and surgical sponge weighting.

All surgical procedures were performed by surgeons having necessary specialized expertise in thyroid surgery. The standard operative technique was used in both groups for thyroidectomy.

Statistical analysis

The data was collected and analysed using SPSS version 20.0. The level of significance was set at 0.05, and all results were expressed by frequency (percent) for qualitative variables and mean \pm SE for quantitative variables.

RESULTS

The data was collected from 102 patients. The total number of patients included in the study was 102 (n=102) with 51 patients in each group. Number of female patients was 45 (88.2%) and 41 (80.3%) in groups A and B, respectively. In

group A frequency of male patients was 9 (17.6%) and in group B it was 7 (13.7%). The mean age of the patients undergoing surgery was 41.7 ± 7.1 (group A) and 39.4 ± 6.7 (group B); minimum age was 18 years, and maximum age was 67 years. The various parameters compared between the two groups are shown in Table 1. The operative time was shorter in group A 92 ± 9.6 mins as compared to Group B 123 ± 7.9

mins. The peroperative blood loss as well as total post operative drainage volume was less in Group A than in Group B. The postoperative calcium levels remained in the normal range 8.62 ± 2.1 mg/dl in Group A and fell below the normal range in quite a number of patients in Group B 7.55 ± 1.6 mg/dl.

Table 01: Comparison of perioperative parameters between LigaSure and conventional technique

Peri-operative parameters	LigaSure technique (n 51) Group A	Conventional suture tie technique (n 51) Group B	P value
Patients	51	51	
Mean age(years)	41.7 ± 7.1	39.4 ± 6.7	
Operative time (min)	92 ± 9.6	123 ± 7.9	<0.01
Per-op blood loss (mL)	51.73 ± 5.65	139.42 ± 7.31	<0.01
Postoperative calcium (mg/dL)	8.62 ± 2.1	7.55 ± 1.6	<0.05
Drainage volume (mls)	33.5 ± 4.13	73.8 ± 5.71	<0.05
Hospital stay (days)	1.8 ± 0.7	3.2 ± 0.6	<0.05

DISCUSSION

Thyroid surgery has widely increased with advances in surgical techniques, becoming the most commonly performed endocrine surgery⁷. However, prolonged operative time and high demand for surgical skills are severe weaknesses of the conventional technique. The LigaSure Small Jaw is a novel instrument that provides excellent hemostasis while decreasing thermal injuries compared with previous energy-based devices⁸. Therefore, due to thyroid abundant blood supply and anatomical adjacency to vital organs, LSJ vessel sealing system has been employed in thyroid surgery to minimize undesirable vascular and nerve damage⁹. Unlike conventional thyroidectomy, the electrical vessel sealing system has been suggested to reduce the time of surgery, RLN damage, and parathyroid manipulation.

Molnar et al. reported their observation that using the LigaSure small jaw device to perform total thyroidectomy is a reliable option¹⁰. Sutureless thyroid surgery has gained grounds in the last decade. In recent studies effectiveness of LigaSure in hemostasis and dissection has been demonstrated in thyroidectomies¹¹.

In our study patients who underwent surgery with Ligasure technique showed reduced operative time as demonstrated by other studies.¹² Regarding intraoperative blood loss our study showed significantly less bleeding which is contrary to a previous study on ligasure.¹³ In present study fewer changes were observed in the postoperative calcium levels as ligasure causes less thermal injury to parathyroids. In a study temporary hypoparathyroidism was reported to be lower in ligasure versus conventional technique.¹¹ However, the effect of LigaSure use in reducing operation time, hospital stay, and intraoperative and postoperative complications are controversial according to some studies.¹⁴⁻¹⁶

CONCLUSION

It is concluded that LigaSure is significantly advantageous over conventional technique in reducing operative time as well as perioperative and postoperative blood loss and parathyroid injury.

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