

# In Open Thyroidectomy, the Focus Harmonic Scalpel was Compared to Other Hemostatic Techniques

Palle Jorgensen\*

Department of Mathematics, School of Advanced Sciences, Vellore, India

## Abstract

The goal of this study was to compare the efficacy and surgical outcomes of total thyroidectomy performed with the Focus Harmonic scalpel (Ethicon, Cincinnati, OH) versus other hemostatic procedures. The operating time, blood loss, pain, complications, and length of hospital stay were all assessed. The Focus Harmonic scalpel reduced operative time by 22,428 minutes and blood loss by 13,914 mL when compared to conventional techniques or the LigaSure Precise Vessel Sealing System (Medtronic, Minneapolis, MN). The Focus Harmonic scalpel group had a significantly shorter hospital stay, with a mean reduction of 0.410 days.

**Keywords:** Scalpel • Thyroidectomy • Harmonic • Surgical

## Introduction

Thyroidectomy is a common endocrine surgery procedure used to treat benign and malignant thyroid diseases. Theodor Kocher pioneered and standardised this surgical technique in the late 1800s. Because the thyroid gland is highly vascularized, thorough hemostasis is an important step in the surgical procedure. It enables a dry operative field, avoids damage to adjacent vital structures, and reduces the risk of postoperative complications. The traditional method for achieving hemostasis during thyroidectomy involves knot tying/clipping and electrocoagulation, both of which are effective but time-consuming. Furthermore, the heat transmitted during electrocoagulation has the potential to cause injuries to the surrounding structures [1].

The Focus Harmonic scalpel employs ultrasound vibration of a blade at 55 Hz over an 80-micrometer distance. The mechanical energy generated is transferred to tissue proteins, where it denatures them by cleaving hydrogen bonds. Protein denaturation results in the formation of a protein coagulum, which seals the vessels and maintains hemostasis at low temperatures (508–1008°C). Thermal injury caused by ultrasound has been shown to be reduced when compared to electrocoagulation, which uses higher temperatures (150–4008°C). The LigaSure Precise Vessel Sealing System is a bipolar coagulation device that denatures the vascular wall's collagen and elastin. Both instruments have been shown to reliably seal vessels with diameters of up to 7 mm.

Only prospective randomised controlled trials comparing the outcomes of a Focus Harmonic scalpel to other techniques, such as knot-and-tie with/without electrocoagulation and LigaSure Precise, were considered. Furthermore, studies with two or more comparative arms were included if the results for the LigaSure Precise and the Focus Harmonic scalpels were reported separately. Exclusion criteria for studies included: retrospective, non-randomized studies; language other than English; duplication; status of publication (abstract review or articles awaiting full text publication); studies not using the Focus Harmonic scalpel or comparing only the LigaSure Precise versus conventional ligation; and studies with different results than those sought [2].

\*Address for Correspondence: Palle Jorgensen, Department of Mathematics, School of Advanced Sciences, Vellore, India, E-mail: pallejorgensen@gmail.com

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**Received:** 01 August, 2022, Manuscript No: glta-22-82565; **Editor Assigned:** 03 August, 2022, PreQC No: P-82565; **Reviewed:** 15 August, 2022, QC No: Q-82565; **Revised:** 20 August, 2022, Manuscript No: R-82565; **Published:** 27 August, 2022, DOI: 10.37421/1736-4337.2022.16.357

We limited our study to adults over the age of 18 who had benign or malignant thyroid disease and were scheduled for total open thyroidectomy. Studies evaluating videoassisted or endoscopic procedures were excluded, as were studies involving partial or total thyroidectomy with additional procedures such as lateral neck lymph node dissection. In each study, the following outcomes were obtained: operating time, volume of blood loss, pain, length of hospital stay, and complications.

When anatomically adjacent structures are identified and preserved, as well as adequate hemostasis, total thyroidectomy is typically associated with no mortality and low morbidity. This procedure may result in postoperative laryngeal nerve (RLN) palsy, permanent or transient hypocalcemia, bleeding, hematoma, and seroma. 30 RLN palsy affects 0% to 23% of patients. Postoperative hypoparathyroidism can reach 63% of patients [3].

## Literature Review

The Focus Harmonic scalpel was initially developed and widely used in laparoscopic abdominal surgery. It has found a successful application in otolaryngology as well as open and minimally invasive thyroid surgery in recent years. Barczynski et al [32] demonstrated that the Focus Harmonic scalpel is safe to use in minimally invasive videoassisted thyroidectomy (MIVAT) operations, facilitates dissection, and allows for a significant reduction in operating time. The use of these devices, however, does not rule out heat dispersion. Druzijanic et al [33] demonstrated that the lateral thermal damage of the Focus Harmonic scalpel power 5 and the LigaSure Precise during peritoneal incision was 127.48 lm and 144.18 lm, respectively, during peritoneal incision.

Contin et al [34] demonstrated in a meta-analysis of 35 studies that ultrasonic devices significantly reduced operating time when compared to conventional techniques; additionally, the authors emphasised that operations performed with the Focus Harmonic scalpel were faster than those performed with the LigaSure Precise. Other studies have found that the Focus Harmonic scalpel has a significantly shorter operative time. The Focus Harmonic scalpel was found to be a safe alternative to traditional techniques, allowing for significant reductions in operating time without increasing the rate of complications [4].

The Focus Harmonic scalpel is a reliable and safe tool for total thyroidectomy. This meta-analysis confirmed that it is more effective than traditional techniques in terms of operative time, blood loss, and length of stay, with a statistically and clinically significant difference in outcomes. There were no significant differences in complications and when compared to the LigaSure Precise.

In terms of hospital stay, 7 studies reported a reduction of 20.536 days when using the Focus Harmonic scalpel versus conventional techniques; this

result was statistically and clinically significant. Some authors demonstrated in the literature that a careful selection of patients, accurate prevention of postoperative complications, and the possibility of outpatient thyroidectomy with its potential risk of postoperative hematoma can reduce the length of hospital stay [5].

## Discussion

Despite the high cost of ultrasonic devices, demonstrated that the average total cost of thyroidectomy was 50 to 60 euros lower in patients operated with the Harmonic scalpel than in patients operated without it. When the charges for operating room time, disposable materials, and drugs were considered, there was no significant difference in cost between the Focus Harmonic scalpel and the clamp-and-tie technique. Another factor to consider is that the surgeons who conduct these trials may have significantly more experience with the Focus Harmonic scalpel than regular thyroid surgeons who are using it for the first time, so the timesaving effect of the Focus Harmonic scalpel may be exaggerated [6,7].

## Conclusion

In terms of the validity of included studies, our meta-analysis, like others, had limitations due to the heterogeneity of the studies chosen. All studies included patients with benign and malignant thyroid pathologies, with no information on thyroid functionality or preoperative fine-needle aspiration (FNA). All of these factors may have an impact on the measured outcomes. However, we strictly adhered to a protocol in the study selection process in order to minimize potential bias in the meta-analysis. Ethicon released a new generation of the Focus Harmonic scalpel, called the Focus1, about a year ago, with tissue-adapting technology.

## Acknowledgement

None.

## Conflict of Interest

There are no conflicts of interest by author.

## References

1. Cannizzaro, Matteo Angelo, Laura Borzi, Salvatore Lo Bianco and Valeriya Okatyeva, et al. "Comparison between Focus Harmonic scalpel and other hemostatic techniques in open thyroidectomy: A systematic review and meta analysis." *Head & neck* 38 (2016): 1571-1578.
2. Revelli, Luca, Gianfranco Damiani, Caterina Bianca Neve Aurora Bianchi and Serafino Vanella, et al. "Complications in thyroid surgery. Harmonic scalpel, harmonic focus versus conventional hemostasis: A meta-analysis." *Int J Surg* 28 (2016): S22-S32.
3. Papavramidis, Theodosios S., Ioannis Pliakos, Angeliki Chorti and Stavros Panidis, et al. "Comparing Ligasure™ Exact dissector with other energy devices in total thyroidectomy: A pilot study." *Gland Surg* 9 (2020): 271.
4. Manouras, Andreas, Haridimos E. Markogiannakis, Panagiotis B. Kekis and Emmanuel E. Lagoudianakis, et al. "Novel hemostatic devices in thyroid surgery: Electrothermal bipolar vessel sealing system and harmonic scalpel." *Expert Rev Med Devices* 5 (2008): 447-466.
5. Cannizzaro, Matteo Angelo, Salvatore Lo Bianco, Laura Borzi and Andrea Cavallaro, et al. "The use of focus harmonic scalpel compared to conventional haemostasis (knot and tie ligation) for thyroid surgery: A prospective randomized study." *Springerplus* 3 (2014): 1-5.
6. Sartori, Paola Vincenza, Sergio De Fina, Giovanni Colombo and Francesco Pugliese, et al. "Ligasure vs. Ultracision® in thyroid surgery: A prospective randomized study." *Langenbeck's Arch Surg* 393 (2008): 655-658.
7. Ruggiero, R., G. Docimo, A. Bosco and M. Lanza Volpe, et al. "Update on sutureless thyroidectomy." *Il Giornale Di chirurgia* 39 (2018): 45.

**How to cite this article:** Jorgensen, Palle. "In Open Thyroidectomy, the Focus Harmonic Scalpel was Compared to Other Hemostatic Techniques." *J Generalized Lie Theory App* 16 (2022): 357.