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Original Research Article

Sutureless versus conventional thyroidectomy

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ABSTRACT

Background: The thyroid gland is a highly-vascularized organ, prompt and effective hemostasis is a crucial part of the procedure. Nowadays with the major advent of energy devices such as ultrasonic coagulation (Harmonic Scalpel, Ethicon) and bipolar energy (LigaSure, Valleylab) for cutting and hemostasis introducing new methods of vessel ligation and division without increasing the risk of postoperative complications. The aim of this study was to compare the outcome of the use of the Harmonic® FOCUS and conventional suture ligation technique in a prospective comparative study of open total thyroidectomy.
Methods: This was prospective comparative study at Sohag University Hospital, Sohag, Egypt. Patients were divided into two groups, the first group included patients who had the Harmonic® FOCUS thyroidectomy group or Sutureless thyroidectomy (S group), and the second group included patients who received Conventional thyroidectomy group (C group).
Results: Between September 2014 and September 2016, 69 patients, with thyroid disease were enrolled in this study. 34 patients (49.3%) had a Sutureless total thyroidectomy and 35 patients (50.7%) had a conventional total thyroidectomy, the mean age for Sutureless thyroidectomy was39.85±8.47 years and for conventional group was 43.17±9.69 years. the operative time, intraoperative blood loss, postoperative, drainage volume, transient hypocalcaemia, overall postoperative complications and hospital stay were significantly lower in Sutureless thyroidectomy group. no significant difference between both group as regard recurrent laryngeal nerve function.
Conclusions: Sutureless thyroidectomy is the procedure of choice for treatment of thyroid diseases as it had shorter operative time, reduction of overall complications rate and good function results.

Keywords: Harmonic scalpel, Harmonic focus, Sutureless, Total thyroidectomy

INTRODUCTION

In 925 AD the first total thyroidectomy for goiter was reported by Abu al-Qasim Emil Theodore Kocher, was the first to use precise surgical technique and meticulous hemostasis to reduce the mortality rate to 0.5% in more than 5000 thyroidectomies.[1] Due to His work in thyroid surgery, he got to a Nobel Prize in 1909.[2]

The thyroid gland is a highly-vascularized organ, prompt and effective hemostasis is a crucial part of the procedure. Meticulous haemostasis is essential to avoid intraoperative complications and obtaining good visualization of the surgical field and prevent damage to structures such as parathyroid glands or laryngeal nerves.[3]

Nowadays with the major advent of energy devices such as ultrasonic coagulation (Harmonic Scalpel, Ethicon) and bipolar energy (LigaSure, Valleylab) for cutting and hemostasis introducing new methods of vessel ligation and division without increasing the risk of postoperative complications.[4] The aim of this study was to compare the outcome of the use of the Harmonic® FOCUS and

conventional suture ligation technique in a prospective comparative study of open total thyroidectomy.

METHODS

This was prospective comparative study at Sohag University Hospital, Sohag, Egypt. All participants were given a written informed consent to participate, after receiving an explanation of the study protocol, including the both type of operation and complication.

Patients were divided into two groups per the type of thyroidectomy. The first group included patients who had the Harmonic® FOCUS thyroidectomy group or Sutureless thyroidectomy (S group), and the second group included patients who received Conventional thyroidectomy group (C group).

The Ethics Committee at Sohag University Hospital approved this study, and informed consent was obtained from each patient. All patients were evaluated [clinical and laboratory investigation, in addition to vocal cord examination].

Exclusion criteria

- Malignant goiters
- Previous neck irradiation.
- Recurrent goiter,
- Ablation with radioiodine.
- hemithyroidectomy, subtotal thyroidectomy.

Outcome measure

Primary outcome measures

Transient and permanent hypocalcemia and recurrent laryngeal nerve palsy.

Secondary outcomes measure

operative time, length of hospital stay, intraoperative blood loss, volume of drainage fluid and overall complications rate.

Surgical techniques

All operations were done under general anesthesia with endotracheal intubation. After the division of platysma muscle, strap muscle of the neck was split. Cutting of the strap muscles performed in the case of huge goiter. The vascular pedicles of each thyroid lobe were ligated with Vicryl 2/0 suture [in conventional thyroidectomy group] or coagulated and divided with Harmonic® FOCUS (Harmonic - Ethicon Endo Surgery INC - Johnson and Johnson Medical SPA, Somerville, NJ) in Sutureless thyroidectomy group. The thyroid lobe was progressively dissected off trachea after the recurrent laryngeal nerves and parathyroid glands were identified and dissected off the thyroid capsule (Figure 1). To measure the amount of blood loss a suction drain was routinely put in the thyroid bed during the first 48 hours. The strap muscle and platysma muscle were closed with Vicryl 3/0 and the skin was closed with subcuticular suture.

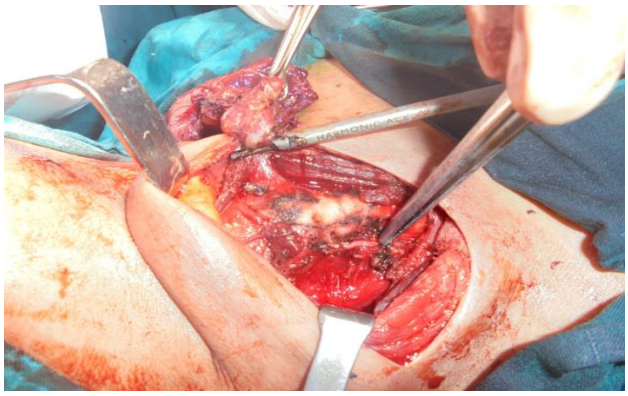

Figure 1: Dissection of both thyroid lobe using harmonic scalpel with preservation of recurrent laryngeal nerve and parathyroid gland.

Figure 2: Final view.

Operative time

The time between skin incision and the end of wound closure.

Intra-operative blood loss

It was measured from the increase in weight of the bloodied swabs or measured from intraoperative drainage).

Statistical analysis

Data were summarized as the mean ± standard deviation (SD) for numerical variables and number (percentage) for non-parametric variables. Student's t-test and Chi-square test were used to compare variables. A P value of <0.05 was considered significant. We used Statistical Package for Social Sciences (SPSS Inc., version 16, Chicago, US), for statistical analysis.

RESULTS

Between September 2014 and September 2016, 69 patients, with thyroid disease requiring surgical treatment and fulfilled our inclusions criteria, were operated at the Department of Surgery, University of Sohag, Sohag, Egypt. Patients were classified into two group Sutureless total thyroidectomy group and conventional total thyroidectomy group. 34 patients (49.3%) had a sutureless total thyroidectomy and 35 patients (50.7%) had a conventional total thyroidectomy, the mean age for Sutureless thyroidectomy was39.85±8.47 years and for conventional group was 43.17± 9.69years, p value =0.135 not significant. In the Sutureless thyroidectomy group, 26 were female and 6 were male while in the conventional group 24 were female and 11 were male, p-value =0.592 not significant. The indications for surgery were presented in Table 1.

Table 1: Indication for surgery.

		Indication			Total
		Multinodular Goitre	**Secondary toxic goitre**	**Primary toxic goitre**	
Type	Sutureless thyroidectomy	29	2	3	34
	Conventional thyroidectomy	28	3	4	35
Total		**57**	**5**	**7**	**69**

The operative and post-operative findings were presented in Table 2. the operative time, intraoperative blood loss, postoperative, drainage volume, postoperative complications (overall postoperative complications) and hospital stay were significantly lower in Sutureless thyroidectomy group.

Table 2: Operative and postoperative outcomes.

	Sutureless thyroidectomy	Conventional thyroidectomy	P value
Operative time	66 minutes	97 minutes	0.000
Intraoperative blood loss	27.41ml	70.37ml	0.000
Post-operative drainage volume	12.67ml	30.46ml	0.000
Hypocalimiea			
Temporary	0	6	0.025
permanent	0	2	0.493
RLN	0	2	Not significant
Unilateral	0	2	Not significant
bilateral	0	0	Not significant
Post-operative complications	0	5	0.05
Hospital stay	2.97days	3.86days	0.000

DISCUSSION

Total thyroidectomy is considered one of the most commonly performed surgical procedures. Thyroid gland is known to be a highly-vascularized organ so rapid and effective hemostasis is a critical step of the procedure.[5] with the appearance and major developments in energy device such as ultrasonic coagulation systems (e.g., Harmonic Scalpel (Ethicon, Washington) SonoSurg (Olympus Medical, Tokyo, Japan) and LigaSure (Valleylab Inc, Boulder, Colorado) this lead to improvement of the result of surgery and reduce complications rate.[6] The result of this study showed that Sutureless thyroidectomy using harmonic focus significantly reduced operative time, intraoperative blood loss, Post-operative drainage volume, temporary hypocalcaemia, post-operative complications and hospital stay.

In Luca Revelli et al, in their misanalysis reported that Sutureless total thyroidectomy was a safe, useful, and fast alternative to conventional total thyroidectomy.[7] The advantage of the harmonic scalpel is that it makes the procedure easy without the need for clips and suture ligations and achieving good hemostasis. It significantly decreased operative time, blood loss and hypocalcemia in HF group, compared with the conventional total thyroidectomy which was comparable to present results. The result of this study reported shorter operative time in Sutureless thyroidectomy group, several studies and met

analysis showed that harmonic scalpel reduces operative time due to the reduction of bleeding and efficient rapid hemostasis.[6,8]

Many studies showed that Sutureless thyroidectomy reduce the post-operative drainage volume our result also showed that Sutureless total thyroidectomy significantly decreases the postoperative drainage volume.[9] This study reported that the use of the harmonic focus significantly reduced postoperative transient hypocalcemia however, no significant difference regarding permanent hypocalcemia. A similar result was reported by the meta-analysis of Melck, while Garas reported decreased the incidence of hypocalcemia in Sutureless total thyroidectomy group.[8,10] The study done by Cirocchi reported no difference between both groups as regard postoperative hypocalcemia.[11]

About recurrent laryngeal nerve function no significant difference between both groups in this study, a similar result was detected by Luca et al.in their met analysis.[7] Although Garas and his colleges reported a higher risk of nerve damage in harmonic scalpel group.[10] However, recent studies done by Carlander et al reported a lower risk of nerve damage in Sutureless thyroidectomy group.[12] This study reported a significant reduction of overall complications rate in Sutureless thyroidectomy group Ecker et al also reported significant reduction of overall complication rate in their met analysis.[9]

The hospital stay was significantly shorter in Sutureless thyroidectomy group in this study this due to decrease the overall complications rate in Sutureless thyroidectomy group. A similar result was detected by Ecker and Garas in their met analysis.[9,10] The main limitation of this study is the small number of cases and it was not randomized study. In the future, we hope to conduct a large multicenter randomized study from our developing country about this important topic as thyroid diseases common in present locality.

CONCLUSION

The result of this study support the use of Sutureless thyroidectomy as the procedure of choice for treatment of thyroid diseases as it had shorter operative time, overall complications rate and good function results.

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Conflict of interest: None declared
Ethical approval: The study was approved by the institutional ethics committee

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