ORIGINAL ARTICLE

Comparison Of Harmonic Scalpel Method With Conventional Procedure For Intraoperative Blood Loss During Thyroidectomy Among Pakistani Patients

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ABSTRACT

Background: Thyroid glands have a complex blood supply, so it becomes necessary to have a proper hemostasis during its surgery. In conventional method, hemostasis is secured by using ties and sutures.
Aim: To compare the intra-operative bleeding in Pakistani patients with multinodular goiter undergoing thyroidectomy with harmonic scalpel method versus Conventional hemostasis.
Study design: It was prospective randomized controlled trial.
Methodology: All patients underwent thyroidectomy for Multinodular goiter were distributed into two assemblies, Group-A (Harmonic-Scalpel Method) and Group-B (Conventional Technique). In Group-A, harmonic scalpel ligated all thyroid vessels. In Group-B, inferior middle and superior were tied using silk sutures 3/0, and all other vessels were sutured by 4/0 or electro cauterized. The two groups were compared for Intra-operative blood loss.
Results: The mean blood loss of patients in group-A was 70.03±5.70ml and in group-B was 96.43±5.93 ml with *p*-value of 0.00001 which is statistically significant. All the data was entered and processed by analysis made using SPSS v23.0.
Conclusion: Harmonic scalpel represents a safe alternative to conventional technique with a significant reduction of blood loss in thyroidectomy.
Keywords: Harmonic scalpel, blood loss, thyroidectomy

INTRODUCTION

The most common procedure in general surgery is thyroidectomy. Thyroid gland has a vast blood supply, so they require a proper hemostasis. Generally, hemostasis is secured by using ties and sutures, but this method is time consuming[1].

Worldwide, it is estimated that goiter affect as many as 200 million people who have a diet deficient in iodine. In the Wickham study from the United Kingdom, 16% of the population had a goiter[2]. In the Framingham study, ultrasonography revealed 36% of women aged 49-58 years had thyroid nodules[3].

It has multiple reasons like iodine deficiency, goitrogens and in born errors in thyroid hormone synthesis causing high production of thyroid stimulating hormone (TSH). Thus cellularity and hyperplasia of the thyroid gland happen leading to goiter development[4].

Treatment options for goiter includes medicines and surgical procedures including thyroidectomy. Surgery is indicated in multi-nodular goiter and for risk of or confirmed thyroid malignancies[5]. It requires safe dissection, meticulous hemostasis, recurrent laryngeal nerve injury and to avoid airway embrassment[6]. In conventional procedures, a risk of slippage of ligature remains leading to re-exploration of operative wound. It results in increased morbidity[7].

Short operative time is the need of hour due to huge work load in a tertiary hospitals. Thus, there is a trend of saving time with use of modern methods[8,9]. Harmonic scalpel (HS) is a modern method as it is safe and effective in terms of good hemostatic control [10]. It has limitations like it's an expensive instrument and experience is required for its use[11]. The current project was designed to investigate the intra-operative bleeding in patients having thyroidectomy for multinodular goiter with harmonic scalpel method.

METHODOLOGY

Enrolled patients in current study were 60 (30 in each group) by using 95% confidence level and 80% power of test from April-October 2018 in the Department of General Surgery, Allama Iqbal Memorial Teaching Hospital, Sialkot[12]. The study design was prospective randomized controlled trial**.** Only patients fulfilling the inclusion criteria i.e., diagnosed with multi-nodular goiter, both genders (16-60 years) were enrolled throughout project. Ethical Committee of hospital approval was taken. Written informed consent was taken from all the patients. In Group-A, harmonic scalpel ligated all thyroid vessels. In Group-B, inferior middle and superior were tied using silk sutures 3/0, and all other vessels were sutured by 4/0 or electro cauterized. The two groups were compared for Intra-operative blood loss.

Statistical Analysis: All the data were entered and processed by using SPSS v23.0. The age and intra-operative blood loss were described by using mean and

standard deviation. Gender was described by using frequencies and percentages. Data was stratified for gender to deal with effect modifiers. Post-stratification, student *t*-test was used. A *p*-value of ≤0.05 was considered significant.

RESULTS

Patients (60) were divided in two equal groups i.e. Group-A (Harmonic Scalpel) and Group-B (Conventional Technique). Gender distribution (Table 1).

Percentages of patients in different age ranges among group A and group B. Hence age groups were compared (Table 2).

Comparison between two groups showed more blood loss (ml) happened in conventional technique. Results are summarized. Difference in blood loss was significant (Table 3)

Stratification was done for the blood loss between groups with respect to gender. Results were summarized (Table 4).

Table-1: Comparison of gender distribution between groups

Genders	Harmonic Scalpel	Conventional Technique	Total
Male (16)	9 (30.00%)	7 (23.33%)	16 (26.70%)
Female (44)	21(70.00%)	23(76.70%)	44 (73.30%)

Table-2: Comparison of age groups between groups

Age group (Years)	Harmonic scalpel	Conventional technique	Total
16-30	8(26.7%)	15(50%)	23(38.3%)
31-45	9(30%)	7(23.3%)	16(26.7%)
45-60	13(43.3%)	8(26.7%)	21(35%)
Total	30(100%)	30(100%)	60(100%)

Table-3: Comparison of blood loss between groups (ml)

	Harmonic Scalpel	Conventional Technique	*P value*
Blood loss (ml)	70.03 ± 5.71	96.43 ± 5.93	0.00002*

*Statistically Significant

Table-4: Stratification of comparison of blood loss between groups with respect to gender (ml)

	Harmonic Scalpel		Conventional Technique		
Gender	N	Mean	n	Mean	*P* value
Male	9	70.22 ± 6.02	7	100.71± 3.73	0.0001*
Female	21	69.95 ± 5.72	23	95.13 ±5.92	0.0001*

*Statistically Significant

DISCUSSION

Through this study, an attempt was made to study the intra-operative bleeding in patients with multinodular goiter undergoing thyroidectomy with harmonic scalpel method versus Conventional hemostasis. This study suggested that there is a significant improvement in blood loss during thyroidectomy with harmonic scalpel. Hence, highest importance lies with the prevention and control of intra-operative bleeding during thyroid surgery. Method of enrollment was adopted in this research with some modifications (13). Diagnosed Pakistani multinodular goiter patients admitted from April-October 2018 in the Department of General Surgery were involved to volunteer in current study. A written consent was taken from all the subjects. For traceability Identifiable codes were given to them.

Our sample size was 60 patients as in other studies 80 sample size was practiced[13]. In contrast, one study carried in 2009 included 100 multinodular goiter patients in his study[14].

In our study, both male and female patients with multinodular goiter were voluntarily enrolled. Males were 26.70% while females were 73.30% in present project. In other study, patients with multinodular goiter, that included 19% men and 81% women. Female gender dominated in both studies. Hence, our work was in line with previous studies[14].

Same methodology but with minor modifications was adopted in our project as documented in one previous study. Patients were divided randomly into 2 sets. The patients in group-I (n=40), the patients received conventional knot tying technique during thyroidectomy; in group-II (n=40), the harmonic scalpel method was employed for the procedure[13]. Hence, our work was in line with previous studies.

Mean blood loss was 104±32 in the tie and clip group and 84±17 in the harmonic scalpel group, with a P value of 0.0001 in one previous study. These results were comparable to those in our study in which the blood loss for the knot and tie group was 96.4ml and in harmonic scalpel group was 70.03ml, with a p-value of 0.00001[14]. Decrease in intraoperative blood loss was recorded in our study with harmonic scalpel as shown in other previous studies as well[15,16].

CONCLUSION

Harmonic scalpel represents a safe method in thyroid surgery with significantly reduced intraoperative blood loss.

Limitations: We admit that our study had a number of limitations. It included too small sample size and financial constrains with lack of resources.

Strengths: Current study, compared modern technique with conventional procedure for intraoperative blood loss during thyroidectomy among pakistani patients. No similar study is available for comparison among our population.

Conflict of interest: None.

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