

Harmonic scalpel method vs conventional procedure for hospital stay during Thyroid Surgery

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Abstract

Background: Thyroidectomy is the most common operative procedure performed by ENT, Head and Neck Surgeon. To overcome the hospital stay as well as financial burden on patients and hospital every surgeon wishes to minimize the patient hospital stay post-operatively. The availability of modern hemostatic gadgets like harmonic scalpel has very much eased the surgeon job as well as least complications like post-operative hematoma formation in thyroid and other neck surgeries.

Aim: To compare the hospital stay of patients with multi-nodular goiter undergoing thyroidectomy with harmonic scalpel versus conventional method.

Study design: It was prospective randomized controlled trial.

Material and Methods: All patients (60) underwent thyroidectomies for multi-nodular goiter during from January 2021 to December 2021. were distributed into two groups, In group-A, harmonic scalpel was used for hemostasis. In group-B, inferior middle and superior thyroid arteries were tied using silk sutures 2/0, and all other vessels were sutured by 3/0 vicryl or electro cauterized. The two groups were compared for post-operative hospital stay.

Results: The mean hospital stay of patients in group-A was 1.9 ± 0.5 days and in group-B was 3.2 ± 0.5 days with p-value of 0.00001 which is statistically significant.

Conclusion: Harmonic scalpel can be used regularly which significantly reduces hospital stay after thyroidectomy.

Keywords: Multi-nodular, goiter, harmonic scalpel, thyroidectomy.

Introduction:

Thyroidectomy is commonly performed procedure in Otorhinolaryngology, Head and Neck surgery department. Thyroid gland is a highly vascular endocrine gland, so duration of hospital stay of patients depends on proper hemostasis post-operatively. Usually, hemostasis is secured by using cautery and sutures, but this method is time consuming.¹

The standardized thyroid surgery developed by Theodor Kocher and Theodor Billroth, the pioneers of thyroid surgery, has not undergone a major change in operative technique in the last century.¹ It is estimated that goiter affect as many as 300 million people who have a diet deficient in iodine world wide.²

In a study from the United Kingdom, 18% of the population had a goiter in different forms.² In another study, ultrasonography revealed 4% of men above 60-years had thyroid nodules.³ In one German study (68%) subjects had multiple thyroid nodules when screened. In another previous study conducted in Germany, ultrasonographic screening of more than 100,000 people detected thyroid nodules in 36% of the normal population.⁴

Goiter is an enlarged thyroid gland. It can be diffused or multi-nodular. It can be caused by iodine deficiency, goitrogens and genetically synthetic thyroid disorders resulting in high production of thyroid stimulating hormone (TSH). Thus cellularity and hyperplasia of the

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Table 1: Comparison of age groups between groups

Age group (years)	Harmonic scalpel	Conventional technique	Total
20-30	10 (33.33 %)	15 (50%)	25 (41.66%)
31-40	12 (40 %)	10 (33.33 %)	22(36.66%)
41-55	08 (26.66 %)	05 (16.66 %)	13(21.67%)

Table 2: Comparison of gender distribution between groups

Genders	Harmonic Scalpel (n=30)	Conventional Technique (n=30)	Total
Female	21 (70%)	18 (60%)	39 (65 %)
Male	09 (30 %)	12 (40%)	21 (35 %)

Table 3: Comparison of duration of hospital stay between groups (days)

	Harmonic Scalpel (n=30)	Conventional Technique (n=30)	P-value
Hospital stay in Days	1.9 ± 0.5	3.2±0.5	0.00001*

thyroid gland occur leading to goiter development.⁵ Mainly surgical procedures including thyroidectomy are available as treatment options for nodular goiter, which causes compression symptoms or done for cosmetic reasons, confirmed or suspected thyroid malignancies.⁶ It requires safe and complete dissection, meticulous hemostasis, recurrent laryngeal nerve and parathyroid gland identification. In conventional procedures, a risk of slippage of ligature may lead to haematoma formation which may lead to re-exploration of operative wound. It results in increased morbidity in the form of damage to recurrent laryngeal nerve and parathyroid glands.⁸

Due to heavy work load on tertiary care hospitals short operative time as well as less duration of hospital stay for the patients after surgical procedure are the need of modern era. Thus, there is a trend of short hospital stay with use of modern methods.^{9,10} Harmonic scalpel (HS) is a modern method as it is safe and effective with good hemostatic control.¹¹ The ultrasonically activated scalpel (harmonic scalpel) that uses high frequency mechanical energy makes it possible to cut and coagulate tissues and vessels simultaneously, without the need of knot tying. Therefore, this device might be useful to reduce operation time and hypoparathyroidism since in thyroid surgery that requires a large amount of knot ty-

ing and may impair the pedicle of parathyroid gland during knot tying. It has limitations like it's an expensive instrument and experience is required for its use.¹² The aim of this study is to calculate the duration of hospital stay in patients having thyroidectomy for multi-nodular goiter with harmonic scalpel method.

Material and Methods:

In current study, enrolled patients were 60 (30 in each group) by using 95% confidence level and 80% power of test. This study was carried out in the Department of ENT, Head and Neck Surgery of Kuwait Teaching Hospital, Peshawar, Pakistan from January 2021 to December 2021. The study design was prospective randomized controlled trial. Only patients fulfilling the inclusion criteria i.e., diagnosed with multi-nodular goiter, both genders (20 to 55 years) were included in the current study. 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 arteries were tied using silk sutures 2/0, and all other vessels were sutured by 3/0 or electro cauterized. The two groups were compared for their post-operative duration of hospital stay.

Statistical analysis: All the data were entered and processed by using SPSS v23.0. The age and hospital stay 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). Percentages of patients in different age ranges among group-A and group-B are shown in table-1. Gender distribution shown in table 2. Hence age groups were compared. Comparison between two groups showed long hospital stay (days) happened in conventional technique. Results are summarized in table-3. Difference in hospital stay was significant.

Discussion:

This is an attempt made to study the duration of hospital stay of patients undergoing thyroidectomy with harmonic scalpel method versus conventional suture method. Hence, highest importance lies with the prevention of any complications and short hospital stay after thyroid surgery. A written consent was taken from all the patients. Our sample size was 60-patients as in other many studies 60-90 sample size was kept.¹³ In contrast, another study by Cannizzaro MA, Bianco SL et al., included 100-goiter patients in their study.¹⁴ Hence, our work was nearly similar to others previously done studies. In our study, both male and female patients with multi-nodular goiter were enrolled voluntarily. In this study males were 09(30%) while females were 21(70%). In a study conducted in USA, patients with multi-nodular goiter, that included 81% men and 19% women. Male gender dominated in USA studies.¹⁴ which was in contrast to our study.

Nearly same methodology was adopted in our study as documented in one previous study with some modifications. Patients were divided randomly into 2 sets in a previous study, 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.¹⁵ Hence, our work was consistent with previous studies already done. Mean duration of hospital stay in our setting was 1.9 ± 0.5 post-thyroidectomy by harmonic scalpel whereas 3.2 ± 0.5 was observed in the tie and clip group with a significant P-value of 0.0001. There was a significant difference in duration of stay at hospital in our study. Paradoxically, in one study carried in Europe, there was no difference in hospital stay among two compared groups. Duration of stay was 2-days in both groups.¹⁵ In a study conducted by Jamil A et al., from Pakistan, the sample size was 60 and duration of stay in hospital was 2.90 ± 0.80 in Harmonic group vs 4.20 ± 0.76 in conventional method,¹⁶ which is nearly comparable to our study. Duration of stay following conventional technique in our setting is more because of many reasons like patients of

remote areas, lack of proper facilities and lack of advancement in our medical setups.

Limitations: The limitation of our study, too small sample size and financial constrains in the form of resources.

Conclusion:

Harmonic scalpel provides a safe method for thyroidectomy with short duration of hospital stay post-operatively reducing burden on the patient's expenditures and National Health system.

Conflict of interest: None

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Role and contribution of authors:

Naseem ul Haq, collected the data, references and did the initial writeup.

Farhan Salam, collected the data and helped in introduction and discussion writing.

Arif Raza Khan, critically review the article and made the final changes.

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