

# “A Prospective Study Comparing the Harmonic Focus and Traditional Suture Ligation Technique in Open Thyroidectomy”

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## ABSTRACT:

**Aim and objective:** To analyse the outcomes of harmonic focus and traditional suture ligation technique in open thyroidectomy in terms of operating time, volume of blood loss, infection, hypocalcemia and RLN palsy

**Materials and methods:** A prospective comparative study conducted in the Department of General surgery, Govt Rajaji Hospital & Madurai Medical College from November 2021– October 2022. Totally 40 patients were included in the study.

**Observation and results:** On assessing the variables related to the surgical procedure it was found that the operating time and blood loss was found to be having significant association by performing the t test ( $p < 0.005$ ) whereas the other post operative variables like volume of drainage fluid, calcium at 12th hour and 48th hour, temporary and permanent hypocalcemia were found to be insignificant. Among the study groups, it was found that the wound complication like seroma was seen in harmonic focus group (5%) whereas the other features like hematoma was seen in the traditional group (10%). On assessing the wound pain, pain in the neck during swallowing and length of the hospital stay were found to be insignificant between groups.

**Conclusion:** The present study concluded that using harmonic focus in open thyroidectomy reduces operating time and blood loss compared to traditional suture ligation technique

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## I. INTRODUCTION

The most common procedure carried out was the total thyroidectomy in most of the thyroid diseases. The thyroid gland was found to have a vascular network, so achieving the effective hemostasis was found to be a crucial part and thus ensuring the dry surgical field was recommended so as to avoid the fatal haemorrhages and also the other vital structures such as the recurrent laryngeal nerves and the parathyroid glands. The significant complications such as the permanent recurrent laryngeal nerve (RLN) palsy and hypoparathyroidism with chance of to 14 % and 5 % percent [2]. As the technology advances , using new energy devices like ultrasonic coagulation (Harmonic Scalpel, Ethicon) and bipolar thyroidectomy became one of the common practice. Various centres had decided to adopted few techniques to overcome certain features of the conventional technique like classic suture ligation in comparison with knot-and-tie manoeuvres, using the metal clips through the monopolar electrocoagulation. Using the suture ligation was the time consuming procedure and the clips carries the risk of slipping, monopolar electrocautery causes the high risk of injury to the surrounding tissues due to the heat. New techniques was used so as to achieve a safe and faster haemostasis with low thermal spread so as to decrease both the operating time and complications. The HS (Harmonic scalpel) came into picture from 1990s helped to controls the bleeding through the sealing mechanism by a protein coagulum at temperature between 50 to 100 °C. It was found to have cutting and coagulation of blood vessels through the denaturing proteins by hydrogen bonds breakage in the protein molecules when the blade vibrates by 55.5 KHz. The thermal injury created by this method was 10-fold less as compared to that of electrocoagulation [3]. Also the advantage of using the device, allowed to cut and coagulation simultaneously, thus the operating time and the total operating cost as was found to be reduced to a significant level. Hence the current study was done to determine the outcomes of harmonic focus and traditional suture ligation technique in open thyroidectomy, operating time, volume of blood loss, infection, hypocalcemia and RLN palsy.

## II. AIM AND OBJECTIVES

To analyse the outcomes of harmonic focus and traditional suture ligation technique in open thyroidectomy in terms of operating time, volume of blood loss, infection, hypocalcemia and RLN palsy

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### III. MATERIALS AND METHODS

A prospective comparative study conducted in the Department of General surgery, Govt Rajaji Hospital & Madurai Medical College from November 2021– October 2022. “Totally **40** patients were included in the study .

#### 2.1 Mode of Admission

Patient with clinical features of the goiter and presenting to the in out-patient clinic were grouped as follows.

1. Goitre
2. Solitary thyroid nodule
3. Diffuse multinodular goitre
4. Dominant nodule
5. Toxic nodular goitre

#### 2.2 Evaluation

Routine investigations done as a routine preoperative evaluation were

1. FNAC
2. Thyroid function test
3. Examination of the vocal cord
4. Baseline serum calcium to compare the post operative value
5. USG of thyroid

#### 2.3 Procedure

Total thyroidectomy for nontoxic multinodular goitre among patients without any existing major comorbid conditions. The steps and the procedure has been already explained. Wound was closed after keeping a corrugated drainage tube.

#### 2.4 Antibiotics and postoperative care

All patients received a single dose of 3<sup>rd</sup> generation cephalosporin 1 hour prior to the surgery. The antibiotic was asked to continue till the 5<sup>th</sup> post operative day. Dressings were removed on day 3 of postoperative day. Vocal cord assessment done.

### IV. OBSERVATION AND RESULTS

**Table 1. distribution of the study population as per age category**

S.no	Age	N (40)	Percentage
1	20-30	15	37
2	30-40	13	31.4
3	40-50	10	25
4	50-60	6	15
5	60-70	1	4

The study population were in the age category between 20 and 40 years of age with 68% , 25% belong to age group of 40-50 years and remaining were more than 50 years of age.

**Table 2. Distribution of the study population as per gender**

S.no.	Sex	N (40)	Percentage
1	Male	6	15
2	Female	34	85

The gender was predominant with female contributing to 85% and the remaining 15% of males.

**Table 3. Distribution of the study population as per type of thyroid lesion**

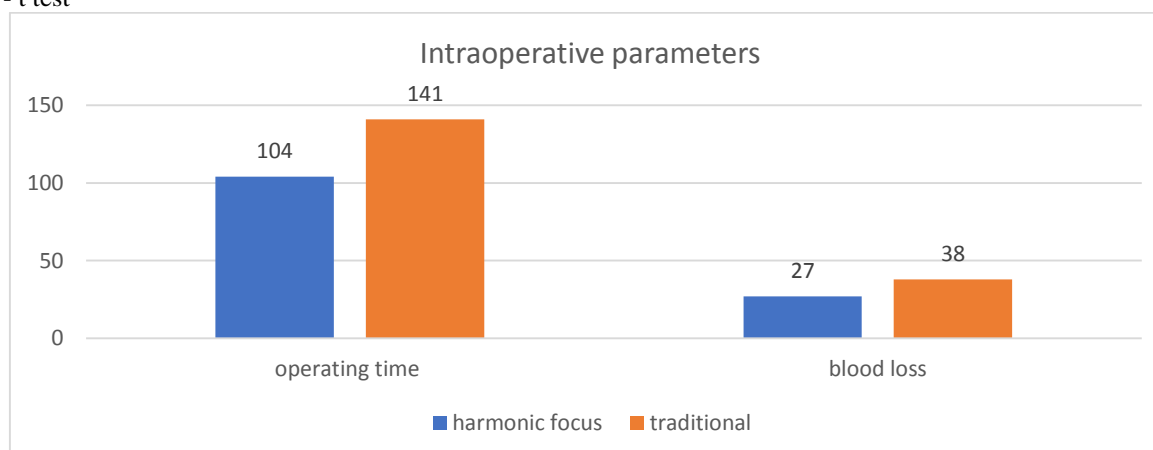
S.No.	Type	Total	Percentage
1	SNG	18	45
2	MNG	19	47.5
3	Diffuse Goitre	3	7.5

The current study showed that 45% of the study population presented with SNG/MNG and the remaining 7.5% contributes to diffuse goitre.

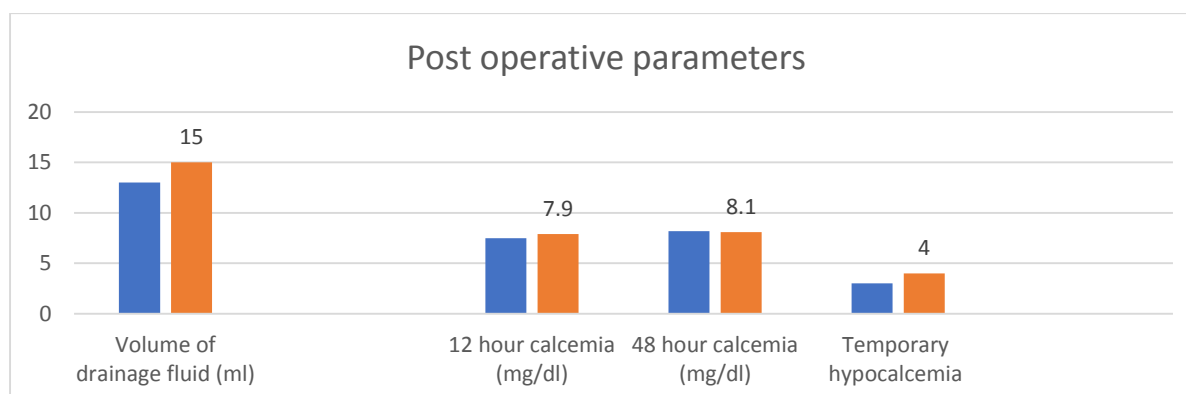
Clinical features during the operative period	Harmonicfocus group (20)	Traditional method group (20)	P value
<b>Intraoperative parameters</b>			
Operating time (min)	104 ± 3	141 ± 17	<0.05*
Blood loss (ml)	27 ± 2	38 ± 14	<0.05*
<b>Post-operative parameters</b>			
Volume of drainage fluid (ml)	13 ± 3	15 ± 4	NS
12 hour calcium (mg/dl)	7.45 ± 0.54	7.9 ± 0.6	NS
48 hour calcium (mg/dl)	8.2 ± 0.31	8.12 ± 0.28	NS
Temporary hypocalcemia	3(12%)	4 (15%)	NS
Permanent hypocalcemia	0	1 (2.3%)	NS

**Table 4. Distribution of the study population as per Clinical features during the operative period**

\*- t test



On assessing the variables related to the surgical procedure it was found that the operating time and blood loss was found to be having significant association by performing the t test ( $p < 0.005$ ) whereas the other post operative variables like volume of drainage fluid, calcium at 12<sup>th</sup> hour and 48<sup>th</sup> hour, temporary and permanent hypocalcemia were found to be insignificant.



**Table 5. Distribution of the study population as per post operative features during the operative period**

Post operative complication	Harmonic focus group (20)	Traditional method group (20)	P value
Wound complication Seroma	1 (5%)	0	NS
Hematoma	0	1 (5%)	NS
Temporary RLN palsy	2 (10%)	1 (5%)	NS
Permanent RLN palsy	0	0	
Postoperative pain (VAS)Neck/back/cervical region	2.47 ± 0.50	2.5 ± 0.43	NS
Wound pain	2.19 ± 0.45	2.5 ± 0.7	NS
Pain/discomfort while swallowing	3.35 ± 1	3.47 ± 0.9	NS
Length of hospital stay (hours)	51 ±3	50 ±3	NS

Among the study groups, it was found that the wound complication like seroma was seen in harmonic focus group (5%) whereas the other features like hematoma was seen in the traditional group (10%). On assessing the wound pain, pain in the neck during swallowing and length of the hospital stay were found to be insignificant between groups

### V. CONCLUSION

The average total duration of surgery is comparatively less by HS procedure among thyroid surgery. The post operative total drainage fluid volume was minimal by using HS in thyroid surgery. The post operative pain reduced significantly patients using HS for hemostasis in thyroid surgery. Post operative transient hypocalcemia was minimal in HS patients. No RLN injury found in the study.

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