

A Study of use of bipolar cautery in thyroidectomy for coagulating vascular pedicles instead of conventional ligation

Govindaraj E, Ravindranath M Meti and Ravikiran H R*

Vijayanagar Institute of Medical Sciences, Bellary, India

***Correspondence Info:**

Dr. Ravikiran H R

Vijayanagar Institute of Medical Sciences, Bellary, India

E-mail: ravikiran.gbd@gmail.com

Abstract

Aim: To present our experience with use of bipolar cautery in thyroid surgery.

Methods and materials: The study was done between August 2011- August 2013. Study included all patients undergoing thyroid surgeries for various benign and malignant conditions of thyroid. This study included all age group and both gender. Vascular pedicles were cauterized using conventional bipolar cautery without knot tying. Postoperative outcomes were analyzed.

Results: Out of 108 cases, 41 male (37.96%), 67 female (62.04%) patients. M:F 1:1.6. 50(46.29%) cases were malignant and 58(53.70%) benign. Among carcinoma thyroid 56% are papillary, 30% follicular, 10% anaplastic and 4% medullary. 52 (48.14%) cases undergone total thyroidectomy, 34(31.48%) lobectomy, 22(20.37%) total thyroidectomy with functional neck dissection. Mean operating time for lobectomy was 20min; total thyroidectomy 35min, total thyroidectomy with functional neck dissection was 90min. Postoperative complications were observed in 11(10.18%) cases. No case of severe bleeding which required re-exploration. 2 (1.85%) surgical site infections. 2(1.85%) cases of unilateral recurrent laryngeal nerve injuries have occurred. Hypoparathyroidism seen in 4(3.7%) cases; 3 transient, 1 permanent due to infiltration by anaplastic carcinoma.

Conclusion: Use of conventional bipolar cautery is safe, effective and time saving in thyroid surgeries.

Keywords: Thyroidectomy, Bipolar Cautery, Conventional Knot Tying.

1. Introduction

Thyroidectomy is a very common surgical procedure performed worldwide. Homeostasis usually achieved by means of clamp and tie for ligation of thyroid vessels, other available methods were clips and electrocautery. Suture ligations, however, are time consuming and carry the risk of knot slipping, whereas clips carry the risk of dislodgment and stitch granuloma. Electro cautery, on the other hand, is an unattractive alternative because it produces remarkable thermal spread to adjacent tissue[1]. Here we present our experience with use of bipolar cautery in thyroid surgery.

2. Methodology

A prospective study conducted between August 2011 and August 2013, which included 108 patients who has undergone thyroid surgery for various benign and malignant conditions. This study included all age group and both gender. All patients were pre-operatively evaluated by history, physical examination, ultrasound neck, FNAC, thyroid profile, IDL. With the approval of ethical committee; patients

were informed about surgery and had written consent. All cases were performed by same team of surgeons. Under GA, patient kept thyroid position, a transverse, curvilinear incision two finger breadths above the suprasternal notch taken, flaps raised. Strap muscles can either be split along the mid line raphe laterally retracted. The inferior, middle and superior thyroid vessels were then divided with bipolar cautery. The thyroid lobe was then medially rotated and after identification of the parathyroid glands and RLN, the thyroid gland was freed from its posterior vascular attachment. Same steps repeated for removal of the contralateral lobe. Wound closed in layers with suction drain. Functional neck dissection was carried out wherever indicated. Postoperative complications such as bleeding, injury to SLN, RLN transient or permanent, transient or permanent hypocalcaemia, hematoma, wound infection and seroma were evaluated and analysed. Patients were followed weekly for the first month and at 3, 6, and 12 months postoperatively.

3. Results

In our present study of 108 cases there 41 male (37.96%) and 67 female (62.04%) patients with M:F ratio 1:1.6.

Most of the patients who had undergone thyroid surgeries are under the age group of 30-50(70.36%) years.

Table 1: Indication for Surgery

Indication	Number
Solitary nodule	25
Multinodular goiter	22
Carcinoma thyroid	50
Hashimotos thyroiditis	2
Thyrotoxicosis	3
Others	6
Total	108

50(46.29%) cases were malignant and 58(53.70%) were various benign conditions. 25(23.14%) cases were solitary nodule of thyroid, 22(20.37%) cases were multinodular goiter, 2(1.85%) cases were operated for Hashimotos thyroiditis, 3(2.77%) cases were operated for thyrotoxicosis.

Table 2: Type of Surgery

Type	Number	Percentage
Total thyroidectomy	52	48.14%
Lobectomy	34	31.48%
Total Thyroidectomy + Functional Neck Dissection	22	20.37%
Total	108	100.00%

Table 3: Post-operative Complications

Sr. No	Complication		Number	%
1	Bleeding		0	0%
	Mild	Nil		
	Severe requiring exploration	Nil		
2	Wound infection		2	1.85%
	Minor	2		
	Severe	Nil		
3	Recurrent laryngeal nerve injury		2	1.85%
	Unilateral	2		
	Bilateral	Nil		
4	Hypoparathyroidism		4	3.7%
	Transient	3		
	Permanent	1		
	Symptomatic	1		
5	Superior laryngeal nerve injury	3	3	2.7%
	Total		11	10.18%

Postoperative complications were observed in 11(10.18%) cases. No case of severe bleeding occurred which required re-exploration. Minor surgical site infection seen in 2(1.85%) cases. 2(1.85%) cases of unilateral recurrent laryngeal nerve injuries have occurred. One was due to infiltration of nerve by the anaplastic carcinoma; other was IJBR (2015) 6 (06)

transient which has resolved with conservative treatment. Hypoparathyroidism was seen in 4(3.7%) cases. 3 were transient, 1 permanent due to infiltration by anaplastic carcinoma.

4. Discussion

In our study of 108 cases there were 41 males (37.96%) and 67 female (62.04%) patients with M: F ratio 1:1.6.

There is slight female preponderance. This is in accordance with most of the studies.[2,3]

71% of patients lie in the age group of 30-50 years.

58(53.70%) cases were various benign conditions. 25(23.14%) cases were solitary nodule, 22(20.37%) cases multinodular goiter, 2(1.85%)Hashimotos thyroiditis, 3(2.77%) thyrotoxicosis.

50(46.29%) were malignant. 56% papillary, 30% follicular carcinoma, 10% anaplastic and 4% medullary.

52 cases (48.14%) had undergone total thyroidectomy.

34(31.48%) had undergone Lobectomy.

22(20.37%) Total thyroidectomy with functional neck dissection.

Mean operating time for lobectomy was 20min, total thyroidectomy 45min, total thyroidectomy with neck dissection 180min. This is consistent with most of the studies and is comparable with use of harmonic and Ligasure.

Manouras *et al*[1]found that compared with the classic technique, surgical time was reduced significantly by about 20% when the bipolar vessel sealer or harmonic scalpel was used (93.3±12.5 vs. 74.3±14.2 and 73.8±13.8 min, P = 0.001, and P = 0.001, respectively.

Siperstein *et al*[4] in 2002in their study the mean operative time was shorter in the harmonic scalpel group compared with the conventional technique group for both lobectomy (89±20 minutes vs. 115±25 minutes; P<.01) and total thyroidectomy (132±39 minutes vs. 161±42 minutes; P<.01) procedures.

In this study no case of severe bleeding occurred which required re-exploration.

Ecker *et al*[5] in 2010did a meta-analysis on Hemostasis in th yroid surgery found that blood loss was reduced significantly by 20.03 mL by use of harmonic scalpel.

Petrakis *et al*[6] in their study found intraoperative total blood loss was similar between the two groups, but postoperative drain volume was less in Ligasure group than in other (21±15 mL; p

<.01). In our study postoperative complications were observed in 11(10.18%) cases.

Barbaros *et al*[7] in 2006 used Ligasure in patients with hyperthyroidism and found the complication rates of the Ligasure and conventional thyroidectomy groups were 4 and 6%, respectively ($p>0.05$).

In our study hypoparathyroidism was seen in 4 (3.7%) cases. 3 were transient and one was permanent due to infiltration by anaplastic carcinoma.

2 (1.85%) cases of unilateral recurrent laryngeal nerve injuries have occurred. One was due to infiltration of nerve by the anaplastic carcinoma; other was transient which has resolved with conservative treatment.

Bove *et al*[8] found that the incidence of transient hypocalcemia was of 24.5%. There were not statistically significant differences in the incidence of transient hypocalcemia in the three groups of study. From 59 patients who experienced transient hypocalcemia, only 8 of them had clinical symptoms. Three cases of permanent hypoparathyroidism, continued postoperatively for six months, were found; two cases in the C [conventional technique of suture ligation] group and another case in the F [Harmonic Focus] group (1.2 % of the study's patients), ($p>0.05$).

Ten temporary palsies of the RLN occurred (four in the F group, three in the L [Ligasure Precise®] group and three other cases in the C group), with full recovery in three months (4.1 % of all cases), ($p>0.05$). There was no case of permanent RLN palsy.

Saint Marc *et al*[9] in their study found the postoperative complication rate of 35% overall, including all transient postoperative disturbances. The incidence of cervical hematomas was 2%, but 3 patients (1.5%), 1 in the LigaSure group and 2 in the clamp-and-tie group, required repeat operations because of respiratory tract obstruction. The incidence of permanent complications was 2.5% overall, including 3 patients (1.5%) with permanent hypocalcemia and 2 patients (1%) with permanent RLN lesions.

Suture granuloma is a rare complication of thyroid surgery and is known to occur after the use of non-absorbable suture materials deep within the skin. Suture granuloma is clinically important in cancer patients because it can mimic tumor recurrence. Recently, Titton *et al*[10] reported that lesions developing in the operation bed after thyroidectomy with features suspicious of malignancy should be confirmed by FNAB.

5. Conclusion

The conventional bipolar cautery is a safe and useful, time-saving adjunct for thyroid surgeries and equally effective as compared to costly instruments like Ligasure and harmonic scalpel.

References

- [1] Manouras A, Markogiannakis H, Koutras AS, *et al*. Thyroid surgery: comparison between the electrothermal bipolar vessel sealing system, harmonic scalpel and classic suture ligation. *Am J Surg*. 2008 Jan; 195(1):48-52.
- [2] Sartori PV1, De Fina S, Colombo G, Pugliese F, Romano F, Cesana G, Uggeri F. Ligasure versus Ultracision in thyroid surgery: a prospective randomized study. *Langenbecks Arch Surg*. 2008 Sep; 393(5):655-8. doi: 10.1007/s00423-008-0386-3. Epub 2008 Jul 22.
- [3] Hallgrimsson P1, Lovén L, Westerdahl J, Bergenfelz A. Use of the harmonic scalpel versus conventional haemostatic techniques in patients with Grave disease undergoing total thyroidectomy: a prospective randomised controlled trial. *Langenbecks Arch Surg*. 2008 Sep; 393(5):675-80. doi: 10.1007/s00423-008-0361-z. Epub 2008 Aug 2.
- [4] Siperstein AE, Berber E, Morkoyun E. The use of the harmonic scalpel vs conventional knot tying for vessel ligation in thyroid surgery. *Arch Surg*. 2002 Feb; 137(2):137-42.
- [5] Ecker T1, Carvalho AL, Choe JH, Walosek G, Preuss KJ. Hemostasis in thyroid surgery: harmonic scalpel versus other techniques--A meta-analysis. *Otolaryngol Head Neck Surg*. 2010 Jul; 143(1):17-25. doi: 10.1016/j.otohns.2010.03.018.
- [6] Petrakis IE, Kogerakis NE, Lasithiotakis KG, Vrachassotakis N, Chalkiadakis GE. LigaSure versus clamp-and-tie thyroidectomy for benign nodular disease. *Head Neck*. 2004 Oct; 26(10):903-9.
- [7] Barbaros U, Erbil Y, Bozboru A, Devenci U, Aksakal N, Dinççag A, Ozarmağan S. The use of LigaSure in patients with hyperthyroidism. *Langenbecks Arch Surg*. 2006 Nov; 391(6):575-9. Epub 2006 Sep 6.
- [8] Bove A, Papanikolaou IG, Bongarzone G, Mattei PA, Markogiannakis H, Chatzipetrou M, D'Addetta V, Di Renzo RM, Fiordaliso M, and Corbellini L. Thyroid surgery with harmonic focus, ligasure precise and conventional technique: a retrospective case-matched study. *Hippokratia*. 2012 Apr-Jun; 16(2): 154-159. PMID: PMC3738418.
- [9] Saint Marc O, Cogliandolo A, Piquard A, Famà F, Pidoto RR. LigaSure vs clamp-and-tie technique to achieve hemostasis in total thyroidectomy for benign multinodular goiter: a prospective randomized study. *Arch Surg*. 2007 Feb; 142(2):150-6; discussion 157.
- [10] Titton RL, Gervais DA, Boland GW, Maher MM, Mueller PR. Sonography and sonographically guided fine-needle aspiration biopsy. *Roentgenol* 2003;181:267-71.