การศึกษาเปรียบเทียบระหว่าง การผ่าตัดไทรอยด์หนึ่งข้างด้วยใบมีด harmonic และ การผ่าตัดไทรอยด์หนึ่งข้างด้วยวิธีดั้งเดิม ในโรงพยาบาลสุราษฎร์ธานี

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The use of harmonic scalpel versus Conventional thyroid lobectomy operation At Suratthani hospital

Abstract

Backgroud : The harmonic scalpel, although more costly, hasgained wide acceptance because it may reduce intraoperative bleeding and operative duration.The significant advantage of this device is the simultaneously coagulating/dissecting functions, and subsequent timing reduction necessary for conventional clamp and tie technique.The aim of this study was to evaluate the efficiency and the safety of Harmonic scalpel when compared to conventional Clamp and tie in open thyroid lobectomy.

Methods : A retrospective study was conducted using the medical records of patients who underwent conventional thyroid lobectomy with clamp and tie technique (CT) and Harmonic scalpel (HS) thyroid lobectomy at Suratthani hospital during 2012-2014. Outcomes, including surgical time, complication rates, and length of hospital stay, were compared between groups.

Results : The use of Harmonic scalpel was associated to a significant reduction of surgical operative time (76.84 mins in CT vs56.86 mins in HS,p 0.0001). The length of hospital stay in 2 groups was similar (3.46 days in CT group vs 3.21 days in HS group) Also the complication rate was similar between groups(recurrent laryngeal nerve paralysis and post operative hematoma).

Conclusions : According to our experience, the Harmonic scalpel represents a safe alternative to conventional haemostasis in thyroid surgery, allowing for a significant reduction of operative time. The rate of complication demonstrated no significant difference among the two groups.

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Introduction

Since Kocher and Billroth first described an acceptable technique of a standardized thyroid surgery in the late 19th century[1], thyroidectomy has become one of the most frequent surgery. The thyroid gland has an extensive vascular network; therefore it is of primary importance to achieve good hemostasis to avoid postoperative hemorrhage which potentially causes patient's asphyxia and death[2]. Thyroid lobectomy is performed in several thyroid diseases and a meticulous hemostasis is important to preserve the recurrent laryngeal nerves. In the traditional technique, the hemostasis relies on knot tying and electrocoagulation.Whileligation is a time-consuming procedure, theelectrocautery have the potential risk of injuring surrounding tissues because of heat dispersion.

In the 1990, theHarmonic scalpel was developed by Ethicon as an alternative to conventional hemostatic tecniques: the device allows simultaneous cutting and coagulation of vessels by using mechanical vibration at a frequency of 55.5 KHz.Since the adoption of the Harmonic scalpel (HS) into modern surgical practice,Many studies show its utility for a wide variety of operation has been well documented. Although it was introduced for abdominal and laparoscopicsurgery[3,4], the Harmonic scalpel device demonstrated some advantages in thyroidectomyin several published studies.[5,6,7,8,9,10]

Over the last decade many reports have evaluated the utility of the HS for thyroid surgery.The investigators have shown similar results regarding reduced operative time with its utilization.[5-10] But conflicting results regarding other post operative outcome such as hypocalcemia,recurrent laryngeal nerve dysfunction.

Shemen (2002) has largely demonstrated the effectiveness of the Harmonic scalpel in thyroidectomy analysis of 105 cases [6]. Siperstein et al. (2002) have successfullyused the Harmonic Scalpel to hemostasis of all the vessels also describing the technique of "double bind" that consists in the double coagulation of two successive areas of the vessel[7]. In 2010 Adrienne L Melck et al have done a meta-analysis of randomized clinical trials, the results shown no difference in incidence of transient recurrent laryngeal nerve dysfunction but the use of HS in thyroidectomy significantly reduced post operative hypocalcemia.[10] Since the Harmonic scalpel has been utilized in all thyroid operations at Suratthanihospital since July 2013.There was no study focus on the benefits of these instrument.The aim of this retrospective study is to explore the effectiveness of the Harmonic scalpel compared with conventional clamp and tie technique.

Materials and method

A retrospective study was conducted in patients who underwent thyroid lobectomy at Suratthani hospital beween 2012-2014.The samples of interest in this study were onlypatients who had either conventional thyroid lobectomy with clamp and tie technique (CT) or thyroid lobectomy with the use of Harmonic scalpel (HS).The chart of 120 patients underwent thyroid lobectomy with conventional technique by Otolaryngologists at Surattthani hospital between January 2012-December 2012 were reviewed.

Exclude 40 cases operated by the General Surgical staff.Group I (conventional technique) was 80 patients.Group II was 71 patients underwent lobectomy by ENT staff during January 2014-December 2014.All patients in Group II operated with the Focus harmonic scalpel.Exclusion criteria were operation done by General Surgeon staff, loss of medical record.All 4 ENT surgeons have more than 5 years experiences

in thyroid operation.

Medical records were used to gather patients' information, including age, sex, pathological diagnosis and size of the tumor. Out comes of the study, including length of hospital stay (days), post-operative complications, e.g., hoarseness, wound hematoma, operative time (minutes), were retrieved from the electronic in-patients medical records. Statistical analysis was performed using multiple linear regression analysis.TheBootstrapping was used for standard error.Comparison of the outcomeswas performed using t-test, with a significancelevel of 0.05.

Results

The demographics and diagnosis of each-group were shown in Table 1.,Figure 1. And Figure 2.The two groups did not differ in regard to age, sex, and pathologies.

Table 1 : Patient demographics and diagnosis

	Group I (conventional) N=80	Group II (harmonic) N=71
Mean age (+/-SD)	46.97 ± 10.47	47.01 ± 11.95
Sex (male/female)	10/70	4/67
Size of tumor	2.64 ± 1.30	3.04 ± 1.26
Diagnosis		
B cell lymphoma	0	1
colloid cyst	1	0
follicular adenoma	12	10
follicular carcinoma	5	2
medullary carcinoma	0	1
multinodular goiter	11	4
nodular goiter	35	44
normal	7	2
oncocytic adenoma	0	1
papillary carcinoma	6	2
papillary carcinoma,follicular variant	0	1
thyroiditis	3	3

Figure 1 : conventional lobectomy group

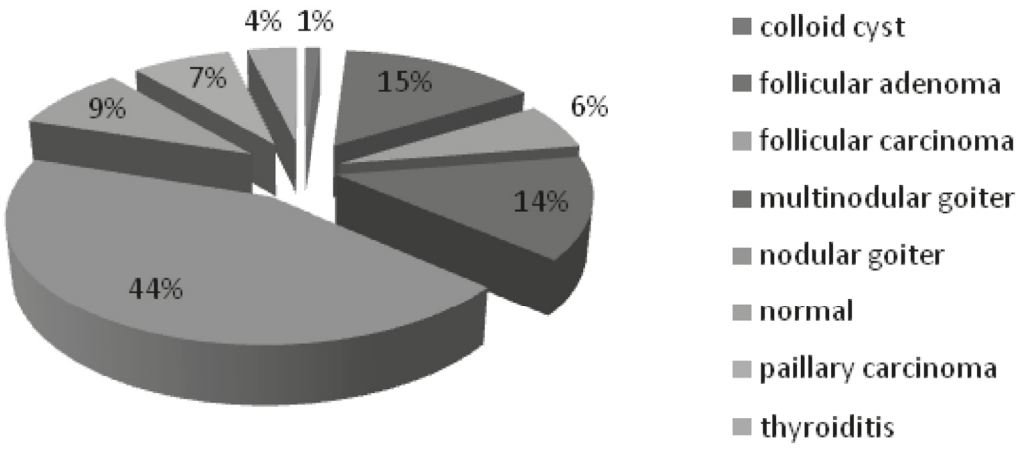
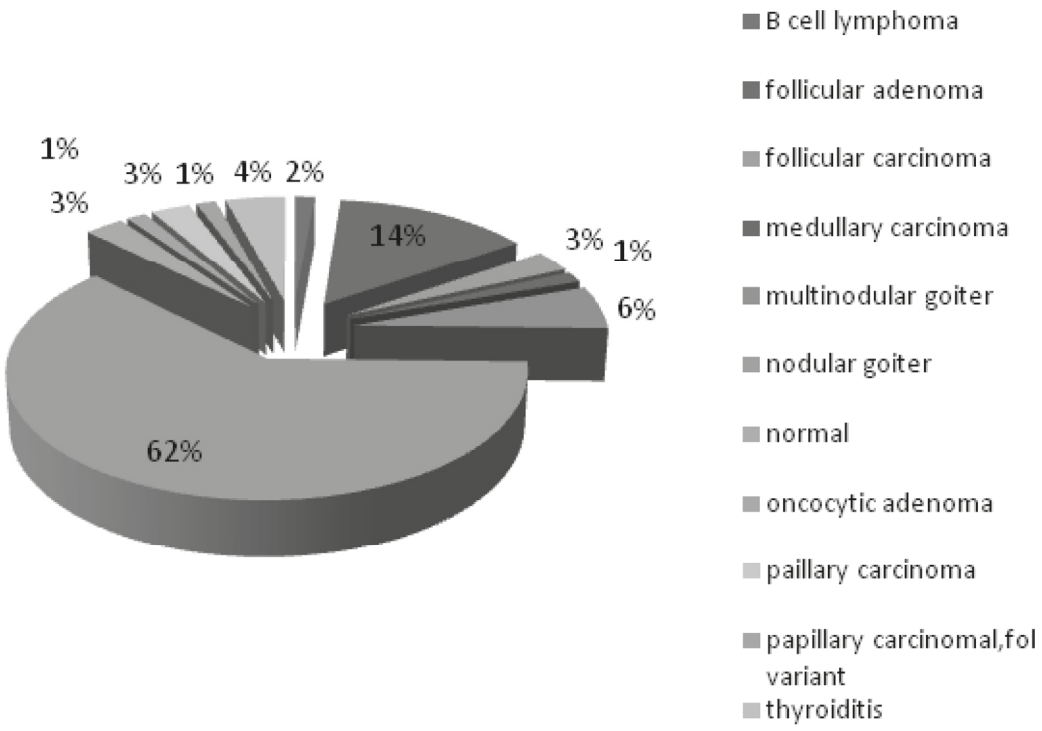


Figure 2 : Harmonic scalpel lobectomy group



Surgical time was significant lower in group II (harmonic) compared with group I (conventional),76.8 ± 25.5 vs 56.8 ± 20.0 mins respectively ($p<0.0001$) (Table 2.) There was no significant difference betweenthe two groups concerning hospital stay. Group I was 3.46 ± 1.01 days vs Group II 3.21 ± 0.75 days ($p>0.05$).In both group there were no post operative hematoma that required re-operation.Post operative recurrent laryngeal nerve paralysis in both groups were not statistically significant (3.8% and 2.9%, $p>0.05$).

Table 2. Comparison of the surgical time,hospital stay and complication

	Group I (conventional) N=80	Group II (harmonic) N=71	P value
Surgical time (mins)	76.8 ± 25.5	56.8 ± 20.0	0.0001
Hospital stay (days)	3.46 ± 1.01	3.21 ±0.75	0.08
complication			
Post operative hematoma	0	0	NS
Recurrent laryngeal nerve paralysis	3.8 %	2.9%	1.00

Discussion

Utilization of Harmonic scalpel in thyroid lobectomy significantly reduced operative times compared to conventional clamp and tie technique with a mean advantage of 20 mins. ($p<0.0001$) This is not a surprising observation,given that the same outcome has been reported repeatedly for thyroid surgery. (7,8,9,10) The harmonic scalpel cuts and coagulates the vessels simultaneously in less than a minute therefore hemostasis is faster and effective.

Apart from the effective instruments, an important factors for the shorter surgical time is the precise dissection,good knowledge of thyroid anatomy, surgical experiences and also the composition of the surgical team. In thyroid surgery, the surgeon usually dissects or applies the scalpel, leaving various surgical maneuvers to the assistant. So a good cooperation in the surgical team would allow for a further decrease in the operative time for both techniques.
hospital stay were not statistically different in both groups.(3.46 ± 1.01 days in group I vs Group II 3.21 ± 0.75 days ($p>0.05$).According to four ENT staffs had different criteria on the amount of fluid in the drainage system that was acceptable within the discharge day. In the future when surgeon become more familiar with the harmonic scalpel, less operative time,less blood loss and less admission day will be possible.

Regarding post operative recurrent laryngeal nerve paralysis, Group I has more incidence than Group II (3.8% and 2.9%) but not statistically significant. Given that HS has been shown to cause less collateral thermal injury thanconventional electrocautery, we would expect to see less recurrent laryngeal nerve dysfuction in the HS group.

Conclusions

According to the results, the FOCUS Harmonic Scalpelcan shorten operative time. This may lead to cost advantages because of the shorter time of anesthesia duration and operative room use thus increasing the number of daily procedures. Moreover, complication concerning the recurrent laryngeal nerve injury was shown to be indifferent between two operations.

Future prospective, randomized trials of larger patient cohorts are needed to draw more meaningful conclusions. In addition, cost-effectiveness analyses to determine whether the costs saved from the reduced time spent in the operating theater outweigh the added cost of the HS scalpel would also

be important.

Therefore from the results of this study, I conclude that the use of Harmonic scalpel during thyroid lobectomy is advantageous and can be one more reliable choice for thyroid surgeon.

References

1. Ellis H: Thyroid and parathyroid. The Cambridge illustrated history ofsurgery, Cambridge University Press, Cambridge; 2009, 195-209.

2. Pezzullo L: Complications of thyroid surgery: analysis of a multicentricstudy on 14,934 patients operated on in Italy over 5 years. World J Surg 2004, 28(3):271–276

3. Laycock WS, Trus TL, Hunter JG: New technology for the division of shortgastric vessels during laparoscopic Nissen fundoplication. A prospectiverandomized trial. SurgEndosc 1996, 10(1):71–73.

4. Amaral JF: The experimental development of an ultrasonically activatedscalpel for laparoscopic use. SurgLaparoscEndosc 1994, 4(2):92–99.

5. Ferri E, Armato E, Spinato G, Spinato R: Focus harmonic scalpel comparedto conventional hemostasis in open total thyroidectomy: a prospectiverandomized trial. Int J Otolaryngol 2011, 2011:357195.

6. Shemen L Thyroidectomy using the harmonic scalpel: analysis of 105consecutive cases. Otolaryngol Head Neck Surg: Offic J Am AcadOtolaryngolHead Neck Surg.2002; 127(4):284–288

7. Siperstein AE, Berber E, Morkoyun E .The use of the harmonic scalpel vsconventional knot tying for vessel ligation in thyroid surgery. Arch Surg. 2002; 137(2):137–142

8. Cannizzaro . SpringerPlus 2014,3:639http://www.springerplus.com/content/3/1/6399.Duan et al. Journal of Otolaryngology - Head and Neck Surgery 2013, 42:62

9. Duan et al : Focus harmonic scalpel compared to conventional hemortasis in open total thyroidectomy-a prospective randomized study. Journal of Otolaryngology-Head and neck Surgery 2013 42:62

10. Adrienne L. Melch,SamM.Wiseman.International Journal of oncology 2010:396079