Clinics in Surgery

Research Article
Published: 06 Dec, 2016

The use of Ultrasonic Dissector in the Prevention of Risk in Thyroid Surgery

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Abstract

Aim: The execution of a correct hemostasis in thyroid surgery is extremely important both for the recognition of the delicate anatomical structures surrounding the thyroid, and to avoid damage of the same with haemostatic maneuvers incongruous. The ultrasonic dissector, developed in '90s, allows for adequate hemostasis of caliber vessels of diameter up to 3mm, and at the same time has a minimum heat dispersion on the surrounding tissues could be used with the necessary precautions in close proximity to vital structures. We present our experience using the ultrasonic dissector in thyroid surgery.

Materials and Methods: It was carried out a retrospective study of patients operated on thyroid from March 2008 to March 2012. Patients were divided into two groups based on the hemostatic technique used: in the conventional technique we used titanium clips, ties and pliers bipolar; in ultrasound technique we have given preference to the ultrasonic dissector but have been used sporadically ligatures and bipolar forceps. It was assessed the duration, the average length of hospitalization, the occurrence of complications and the amount of blood present in the drainage.

Results: From 2008 to 2012 underwent thyroid surgery 148 patients. They were 29 men and 119 women of average age 52 aa (range 22-82). They were performed lobectomy 38 and 110 total thyroidectomy. There were 28 cancers, of which 1 in Hashimoto, Graves 5, 7 hyper functioning adenomas and 107 multinodular goiters. The patients were treated with conventional hemostasis in 64 cases and with the aid of the ultrasonic dissector in 84 cases. The operative time was significantly shorter in patients treated with the ultrasonic dissector (106±23 vs. 148±34 min). The postoperative complications were similar in both groups: we had a total of 4 single-sided momentary paralysis of the recurrent nerve, 1 final. There were two cases of permanent hypocalcemia, one for each group, however, we had a momentary hypocalcemia in 11% (7) of patients treated with Ultracision and in 29.7% (25) of patients treated with conventional therapy. The duration of hospitalization was similar in both groups (1.5±2 days). In the group treated with dissector there was a minor oozing serum sanguineous (45±27 vs. 54±51 mL) although that group has manifested a case of severe bleeding (400 ml) which did not require reoperation.

Conclusions: The Ultracision has proven to be a valuable aid in thyroid surgery. Although the data are insufficient to enable a final decision certainly this tool is proved to have resulted in a reduction in the intervention of the complications of thyroidectomy reducing surgical time and bleeding risk.

Keywords: Thyroid; Ultrasonic dissector; Thyroidectomy

Introduction

The treatment of choice for many thyroid diseases today is represented by total thyroidectomy. Very frequent intervention in endocrine surgery [1]. The thyroid is an organ which presents many vessels, the control of hemostasis is essential to prevent complications such as bleeding and bruising. Other complications in the course of thyroidectomy are: laryngeal nerve palsy and hypoparathyroidism [2]. Good hemostasis to prevent blood loss and bleeding during surgery. So reducing the possibility of potential complication of the parathyroid gland, laryngeal nerves and post-surgery bleeding. Control of the bleeding is possible with clamp and tie use clips of electrocautery and innovative technique of accuracy an hemostasis and reducing of complication post operative [3]. This tool allows of simultaneous cutting and tissue coagulation with dissection and hemostasis. Also you can reduce thermal spread and minimal adjacent tissue destruction and it's minimally invasive [4]. The fist reference about the use of the ultrasonic scalpel in thyroid surgery dates back

OPEN ACCESS

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Received Date: *05 Oct 2016*
Accepted Date: *28 Nov 2016*
Published Date: *06 Dec 2016*

Citation:
Grasso E, Guastella T. The use of Ultrasonic Dissector in the Prevention of Risk in Thyroid Surgery. Clin Surg. 2016; 1: 1212.

Table 1: The results of our retrospective study of 148 patients.

	Group A 84 pz	Grop B 64 pz
Surgical Time	106±23 min	148±34 min
hypocalcemia	11% (7) 0, 84% (1) Def.	29, 7% (25) 0, 64% (1)Def.
Scar size	4, 2±1, 3	5, 5±1, 5
Hospitalization duration	2gg ±1, 5	2gg ±1, 5
Oozing blood serum	45±27ml	55±51ml 1 pz (400ml)

to 2000 [5]. Numerous studies have confirmed the validity of this innovative technology [6].

The aim of the study was to evaluate the use of ultrasonic scalpel in thyroid surgery compared of the traditional technique in a significant number of patients (144). We conducted a retrospective randomized study to identify particularly: analysis of complications, surgical time, overall drainage volume and duration of the hospital stay.

Material and Methods

It was carried out a retrospective study of patients operated on thyroid from March 2008 to March 2012. The 144 patients undergoing total thyroidectomy surgery gave informed consensus of the study and were randomly divided into two groups based on the hemostatic technique used. The patients were treated with conventional hemostasis in 64 cases (group A), while with the aid of the ultrasonic dissector in 84 cases (group B). Group A, treated with the conventional technique, we used titanium clips, ligatures and bipolar forceps; group treated in ultrasound technique, we have given preference to the ultrasonic dissector but have been used sporadically ligatures and bipolar forceps. The comparative preoperative data between the two groups included: age, gender, preoperative serum calcium and thyroid pathology.

Was assessed the duration, the average length of hospitalization, the occurrence of complications and the amount of blood present in the drainage. The duration of surgery was estimated in minutes from skin incision to skin closure.

The postoperative valuation included analysis both of complications (laryngeal nerve palsy, hypoparathyroidism, blood loss, hematoma, seroma, wound infection) and the features after the pre and post surgery (size of the thyroid specimen, postoperative serum calcium levels, overall drained, pain, medications).

In both groups, a suction drain for each thyroid side was placed after surgery and removed between the 1st and 3rd post surgery days.

Serum calcium levels was monitored 12, 24, 48 hours postoperatively and patients were discharged between the 2nd and 4th post-operative day.

Results

From 2008 to 2012 underwent thyroid surgery 148 patients. They were 29 men and 119 women of average age 52 aa (range 22-82). They were performed lobectomy 38 and 110 total thyroidectomy. There were 28 cancers, of which 1 in Hashimoto, Graves 5, 7 hyperfunctioning adenomas and 107 multinodular goiters. The patients were treated with conventional hemostasis in 64 cases and with the aid of the ultrasonic dissector in 84 cases.

There were no significant differences between the two groups regarding age, sex, serum calcium values pre-and post surgery, reoperations, weight and diameter of the thyroid specimen, final histopathologic diagnosis.

The operative time was significantly shorter in patients treated with the ultrasonic dissector (106±23 *vs.* 148±34 min). The postoperative complications were similar in both groups: we had a total of 4 single-sided momentary paralysis of the recurrent nerve, 1 final. There were two cases of permanent hypocalcemia, one for each group, however, we had a momentary hypocalcemia in 11% (7) of patients treated with Ultracision and in 29.7% (25) of patients treated with conventional therapy. The duration of hospitalization was similar in both groups (1.5±2 days). In the group treated with dissector there was a minor oozing serum sanguineous (45±27 *vs.* 54±51 mL) although that group has manifested a case of severe bleeding (400 ml) which did not require reoperation (Table 1).

Discussion

The innovative advances in recent years have developed devices aiming to facilitate the surgical procedures in terms of efficient hemostasis, tissue ligation, and dissection, as well as reduction of surgical time. The electrothermal bipolar vessel sealing system and activated ultrasonic shears represents an alternative technique for hemostasis and the operative risk in surgery. Ultrasound is used in many medical disciplines such as cardiac surgery, thoracic surgery, urology, gynecology and general surgery. In recent years she has found application in thyroidectomy. High frequency ultrasound allows cutting and coagulation the low-temperature fabrics and electively causing less tissue damage by electrocautery and laser [7].

The Food and Drug Administration has approved Ligasure for ligation of vessels up to 7 mm in diameter. Thermal damage is limited to 2 to 3 mm beyond the tissue grasped within the forceps of the device [8,9]. This is a particularly important property in thyroid surgery because it allows safe vascular ligation with minimal risk for damage to the recurrent laryngeal nerve, the external branch of the superior laryngeal nerve, and the parathyroid glands. The literature confirms there is less blood loss (-45%) [10], less post operative pain (-40, 5%) [11] lower consumption of pain medication(-38%) [12], less drainage volume (-50, 5%), smaller and better aesthetic scars [12] and significant reduction in operative time(-47% on average) [11] rapid and effective hemostasis with minimal tissue damages, a significant reduction of time also in terms of use of the operating room (-24 minutes) [11].

An important issue concerning the use of these new sealing modalities is the extent of lateral thermal spread and associated tissue injury. Several experimental studies, however, have proved that this extent is minimal (from 0 to 3 mm) [8,9] and, moreover, all the reported studies in the literature show that they can be used safely in thyroid surgery with no increase in complication rates [13,14].

Lateral thermal damage is limited up to 2 mm beyond the tissue grasped within the forceps of the device [15]. This is an important property in thyroid surgery because it allows safe vascular ligation with minimal risk for damage to the recurrent laryngeal nerve, the external branch of superior laryngeal nerve, and the parathyroid glands.

Conclusion

The harmonic scalpel is safe, useful, and time saving adjuncts for thyroid surgery. The main advantage of this device is simplifying the procedure and eliminates the need for clips and suture ligations

while achieving efficient hemostasis. In our study, they were found to be similarly safe and efficient in terms of hemostasis, surgical time, andThe Ultracision has proven to be a valuable aid in thyroid surgery. Although the data are insufficient to enable a final decision certainly this tool is proved to have resulted in a reduction in the intervention of the complications of thyroidectomy reducing surgical time and bleeding risk.

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