

The Utility of Fibrin Sealant and Safety of Thyroid Surgery without Drainage*

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배액관을 삽입하지 않은 갑상선수술의 안전성과 섬유소응고제의 유용성*

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배경 및 목적

섬유소 응고제(fibrin sealants)는 다양한 두경부수술에서 지혈목적으로 사용되고 있다. 본 연구의 목적은 배액관을 삽입하지 않는 갑상선 수술에서 섬유소 응고제의 효용성과 안정성을 알아보고자 하였다.

재료 및 방법

최근 1년간 108명의 갑상선 수술환자 중에서 수술 후 배액관의 삽입없이 수술을 받은 103명의 환자를 대상으로 하여 임상적인 특징을 분석하였다.

결 과

103명의 대상환자 중에서 남성은 16예, 여성은 87예였다. 대상환자의 평균연령은 46.7 ± 13.0 세였고, 연령분포는 17세에서 72세였다. 갑상선 종물의 평균크기는 2.08 ± 1.61 cm였고, 종물의 크기는 최소 0.2cm에서 최대 10.0cm까지의 분포를 보였다. 수술에는 갑상선 엽절제술이 5예, 갑상선반절제술이 41예, 아갑상선 절제술이 8예, 갑상선 전절제술이 6예, 갑상선 전절제술과 중심경부림프절 절제술이 37예, 갑상선 전절제술과 선택적경부림프절 절제술이 6예가 있었다. 수술 후 합병증은 11예(10.6%)에서 발생하였고, 발생한 합병증으로는 장액성종창이 3예, 혈종이 1예, 일측성 성대마비가 3예, 저칼슘혈증이 4예 있었다. 성대마비는 수술 후 3개월 이내에 모두 호전되었고, 장액성종창은 반복적인 세침흡입으로 호전되었다. 1예의 혈종은 지연성으로 발생하였고, 수술 후 5일째에 수술을 통해 제거하였다.

결 론

이러한 결과에 근거하여 갑상선 수술에서 섬유소 응고제의 사용은 다양한 갑상선 수술에서 효과적인 지혈과 함께 안전하게 사용될 수 있으며, 배액관의 삽입을 감소시켜 줄 수 있을 것으로 생각된다.

중심 단어 : 갑상선수술 · 배액관.

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Introduction

Drain insertion after thyroid surgery remains important to prevent the potential development of a hematoma and seroma that can result in acute venous congestion and upper airway obstruction. Although the selective insertion of drains after thyroid surgery is generally accepted and recommended in some clinics, the use of drain in thyroid surgery is still performed in most clinics especially in bilateral thyroid surgery.¹⁻⁴⁾ The use of fibrin sealant in head and neck surgery is reported for hemostasis and decrease in hospital stay.⁵⁻⁷⁾ For the past one year, we have been routinely using a fibrin sealant at the end of our thyroid surgery in order to achieve hemostasis and to avoid drain insertion. In this study, we describe our 1 year experience with 103 thyroid surgeries without any kind of drainage.

Patients and Methods

We retrospectively obtained data on 108 thyroid surgeries that had been performed by one surgeon at our ENT department between January and December, 2007. All patients checked routine blood laboratory test for bleeding disorder and had within normal limit before operation. During our review, we excluded 5 patients who had undergone drain insertion for hematoma prevention. All thyroid surgeries of 5 patients were performed in the first month that was early period of study and inexperienced. The excluded group included 2 subtotal thyroidectomies, 2 total thyroidectomies with central neck dissection, and 1 total thyroidectomy with multilevel neck dissection.

The study samples consist of 103 patients (16 men and 87 women, mean age of 46.7 years, range 17 to 72 years). The types of operation performed are as follows ; 5 lobectomies, 41 hemithyroidectomies, 8 subtotal thyroidectomies, 6 total thyroidectomies, 37 total thyroidectomies with central neck dissection, and 6 total thyroidectomies with multi-level selective neck dissection. The term hemithyroidectomy was defined as unilateral thyroid lobectomy with isthmusectomy in this study, and the term central neck dissection was defined as lymph node dissection of the level VI group (pretracheal, paratracheal, and prelaryngeal lymph node). We routinely performed central neck dissection in papillary cancer if primary tumor size was greater than 1 cm or had any evidence of lymph node enlargement in the central lymph node group preoperatively or intraoperatively. The central neck dissection was done bilaterally in all central neck dissection pa-

tients. The multi-level selective neck dissection included 3 cases of selective neck dissection (level II, III, IV) and 3 cases of selective neck dissection (level III, IV).

At the conclusion of each operation, hemostasis was achieved meticulously and 2 mL of Tisseel VH (Baxter AG ; Vienna, Austria) was sprayed over the entire surface of the wound. The incision was then closed in the standard manner. No drain was used, and no pressure dressing was applied.

For surgical outcome assessment, the following variables were examined : pathology, mass size in thyroid gland, and post-operative complications (hemorrhage, hematoma, seroma, infection, vocal cord palsy, and hypocalcemia). Postoperative seroma and hematoma were examined at least for 2 weeks postoperatively. Hypocalcemia defined as permanent if the patient has medication of calcium and vitamin D derivatives at the time of 3 months after operation. The size of mass was measured by sonographic or CT examination. In cases of multiple mass, we measured the size in the largest mass among the masses of the thyroid gland.

Statistical analyses were performed using Fischer's exact test and Student's t-test. A p value less than .05 was considered significant.

The study protocol was approved by the Institutional Review Board of the Medical School of Chonbuk National University.

Results

The results of postoperative pathology are summarized in Table 1. There were 42 benign nodules and 61 malignant nodules. Malignant nodule of the thyroid included 58 papillary carcinomas and 3 follicular carcinomas. Benign nodule of the thyroid included 24 nodular hyperplasia (single or multinodular goiters), 14 follicular adenomas, and 4 Hashimoto's thyroiditis.

The mean size of thyroid nodule was 2.08 ± 1.61 cm (range 0.2 to 10.0 cm). There were 85 single thyroid nodules and 18 multiple thyroid nodules. The size of single thyroid nodule was 2.04 ± 1.66 cm (range : 0.2 to 10.0 cm), and the size of multiple thyroid nodule was 1.89 ± 1.36 cm (range : 0.4 to 5.4 cm).

Table 1. Histopathologic distribution of patients

Pathology	Number
Nodular hyperplasia	24
Hashimoto's thyroiditis	4
Follicular adenoma	14
Follicular carcinoma	3
Papillary carcinoma	58
Total	103

Table 2. Perioperative complications according to types of operation

Types of operation	Number	Perioperative complications(11/103, 10.6%)			
		Hematoma	Seroma	RLN injury	Hypocalcemia
Lobectomy	5				
Hemithyroidectomy	41			2	
Subtotal thyroidectomy	8		2		
Total thyroidectomy	6				
TT with CND	37	1	1	1	1
TT with multilevel SND	6				3
Total(%)	103	1(0.9)	3(2.9)	3(2.9)	4(3.8)

RLN : recurrent laryngeal nerve, TT : total thyroidectomy, CND : central neck dissection, SND : selective neck dissection

There was no significant difference in size between single thyroid nodules and multiple thyroid nodules.

Perioperative complications are listed in Table 2. The overall perioperative complication occurred in eleven patients (11/103, 10.6%). Hematoma occurred in one case of total thyroidectomy with central neck dissection, and reoperation for hematoma removal was performed on fifth postoperative day. Seroma occurred in two cases of subtotal thyroidectomy and one case of total thyroidectomy with central neck dissection. All seromas were noticed at first outpatient clinic visit within 2 weeks after operation, and were resolved within postoperative 3 weeks by repeated needle aspiration and compressive dressing. The amounts of seroma were below 15cc in all three cases. Recurrent laryngeal nerve(RLN) injury occurred in two cases of hemithyroidectomy and one case of total thyroidectomy with central neck dissection. All RLN injuries were transient and improved within postoperative 3 months. Hypocalcemia occurred in one case of total thyroidectomy with central neck dissection and three cases of total thyroidectomy with multilevel selective neck dissection. All hypocalcemia were permanent at the time of 3 months after operation.

Discussion

Drains have long been used to defend against a dreaded expanding hematoma and greatly enhanced surgery since it was introduced in the 1940s.⁵⁾ However, as the approach to thyroid surgery has evolved, the value of a drain in thyroid surgery has been debated. Hematomas can result from inadequate hemostasis at the time of closure or increased venous pressure at extubation because of coughing or straining. Neither the use of drains nor bulky pressure dressings prevents hematoma formation. Drains offer no discernible benefit to the patient and if anything, result in a higher rate of infection and bleeding.⁸⁾ Some authors recommended the use of drains in cases of hypervascularity, such as Graves' disease or ex-

tensive dissection of some cancers, being a large dead space, resection of a substernal goiter, and a raw thyroid bed at the conclusion of subtotal thyroidectomy.^{3,4,9)} Many previous studies have shown that selective use of drains after thyroidectomy was feasible and successful.^{1-5,7-9)} The advent of new technology has also improved the ability to achieve and maintain a bloodless field. Ultrasonic technology is based on frictional energy and facilitates ligation of arteries as large as 5 mm, and aids in sealing lymphatic vessels. Fibrin tissue adhesives can be used for wound closure, tissue sealing, and hemostasis. Commercially available fibrin sealant is made up of two components : one component contains fibrinogen, aprotinin, and/or factor XIII, and the other is made up of human thrombin dissolved in a calcium chloride solution. Matthews and Briant compared postoperative drainage in patients who did and did not receive Tisseel.⁷⁾ They found that patient who received Tisseel had significantly less drain output and a significant shorter duration of drain placement. Fibrin glue following parotidectomy also had significantly less drainage than did patient who not received an absorbable hemostatic agent and on coagulant.⁵⁾ Sealant's tissue-adhesive properties reduce the amount of dead space and subsequent wound drainage.⁵⁾ Through a selective use of drains after thyroidectomy insertion of drain has decreased by 25% to 80%.^{1,5,9)} At our study, patients who received fibrin sealant following thyroidectomy without drains were 103(95%) of 108 thyroidectomies. Five patients who had drain insertion after thyroidectomy received operation within first month of study. All operations after first month of study were performed without drain insertion. Furthermore, our series included 37 cases of total thyroidectomy with central neck dissection and 6 cases of total thyroidectomy with multilevel neck dissection, which were having a large dead space and hematoma due to extensive dissection. Perioperative complications accounted for 10.6% in our series with a 0.9% hematoma rate, 2.9% seroma and RLN palsy, and 3.8% hypocalcemia, which is similar to previous another reports.¹⁰⁾ We compared hospital stay

with drain group performed by another surgeon. It showed significant reduction of hospital stay in fibrin sealant without drain group, leading to a reduction in costs for the patients.

On the basis of these results, we believe that the use of fibrin sealant in thyroid surgery decrease the need for drain insertion without the increase of the perioperative complication, even when a total thyroidectomy with central neck dissection or multilevel selective neck dissection has been performed.

Conclusion

We conclude that the use of fibrin sealant in thyroid surgery is safe and helpful alternate method for hemostasis and avoidance of drainage insertion, irrespective of types of thyroidectomy and size of thyroid nodule.

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