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Endoscopic thyroidectomy through improved breast areola approach in males.

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Abstract

To evaluate the safety, feasibility and cosmetic results of endoscopic thyroidectomy via improved breast areola approach for male patients with thyroid tumor. From April 2012 to September 2014, 38 male patients with thyroid tumor underwent endoscopic thyroidectomy at our institution. Among all the patients, postoperative diagnosis included 5 cases with nodular hyperplasia, 2 cases of colloid lesion within a nodular goiter, 8 cases of follicular adenoma and 23 cases of micropapillary thyroid carcinoma. The endoscopic thyroidectomy was completed successfully in all patients. The types of endoscopic procedures were 10 cases with lobectomies, 5 cases with subtotal thyroidectomy, 21 cases with thyroidectomy with ipsilateral central compartment dissection, and 2 cases with total thyroidectomy with bilateral ipsilateral central compartment dissection. The average tumor size was 1.39 ± 1.01 cm (range 0.3-3.5 cm), and the average operating time was 128.1 ± 25.8 cm (range 65-195 cm) minutes. The postoperative drainage volume was 124.1 ± 41.7 ml (range 50-200 ml), and the average length of the hospital stay was 5.29 ± 0.92 days (range 4-8 days). There were no patients developed to hypercapnia. Postoperative complications included transient RLN palsy in 2 cases, transient hypocalcemia in 1 case, swallowing discomfort in 1 case and paresthesia of the chest in 3 cases. Endoscopic thyroidectomy via improved breast areola approach in male patients with thyroid tumor is safe and feasible, it can successfully treat bilateral thyroid diseases, and give an excellent cosmetic result. It might become the procedure of choice for male patients who want the best cosmetic results.

Keywords: Endoscopic thyroidectomy, Breast areola approach, Thyroid tumor.

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Introduction

Since the first reported endoscopic thyroidectomy for thyroid tumor in 1997 [1], the favorable cosmetic effect is widely accepted by many surgeons and patients. In recent years, various approaches for endoscopic thyroid surgery techniques have been introduced. As thyroid disorders are more common in women, the pros and cons of various surgery approaches are mostly explored in female patients. However, with the development of medical concept, endoscopic thyroidectomy was more and more applicated in male patients due to its cosmetic effect and better recovery. In current study, on the basis of our early study, we investigated the safety, feasibility and cosmetic results of endoscopic thyroidectomy via improved breast areola approach for male patients with thyroid tumor.

Patients and Method

From April 2012 to September 2014, a total of 38 male patients with average age of 33.3 ± 10 years (range 20-58 years) with thyroid nodules were performed with endoscopic thyroidectomy via improved breast areola approach. In all patients, the single solitary thyroid nodule was diagnosed preoperatively by clinical examination, ultrasonography, serum thyroid profile studies, including T3, T4 and thyroid-stimulating hormone (TSH) levels. The diameters of the nodules ranged from 0.3 to 3.5 cm (average, 1.39 ± 1.01 cm). All patients were examined with Computed Tomography (CT) to evaluate the volume of the thyroid gland, tumor size, and cervical lymph node metastases. Two patients with nodular goiter cystic change did not undergo pre-operative Fine-Needle Aspiration (FNA), which was performed in all other patients. To evaluate the feasibility and cosmetic results of our endoscopic procedure, all the patients were followed up for 3-29 months. The observation items were as follows: satisfaction with postoperative appearance of the neck, cosmetic satisfaction score ranging from 1 to 5 (1 is extremely dissatisfied, and 5 is extremely satisfied), recurrence, swallowing or the anterior chest discomfort, hypertrophic scar. Informed consent was obtained from all patients. The study was approved by the Wenzhou Central Hospital's Ethical Committee.

Surgical procedures

All patients underwent general endotracheal anesthesia, then they were placed in supine position with the arms tucked close to the side. The legs were placed with herringbone or lithotomy position. The operator stands between the legs of the patient, and the assistant stand at the right side of the patients. Both the two position have its own advantages and disadvantages. The operation space is small and the operation distance is far in herringbone position, while the lithotomy position would affect the hand movement of the surgeon. A 12 mm arc incision was made on the inside margin of right areola, where a 12 mm trocar for endoscopy was inserted. Two 5mm skin incisions were placed along the midpoint of the upper margin of both breast areolas to the sternoclavicular joint (Figure 1). Before establishment of subcutaneous tunnel, tumescent fluid (500 ml NS + 1 ml adrenalin + 50 ml ropivacaine) was injected subcutaneously from chest wall to jugular notch edge to prevent bleeding during subcutaneous blunt dissection and reduce postoperative pain. And then, from 12 mm incision, the subcutaneous tunneling to neck was performed by the use of a special arrow shape blunt separator. A 12 mm trocar was inserted, with CO_2 insufflation pressure set at 5 mmHg to prevent subcutaneous emphysema. Subplatysmal flaps were created with blunt and sharp dissection using ultrasonic shears from the level of the thyroid cartilage to the sternal notch and laterally to the medial border of each sternocleidomastoid muscle.

Figure 1. *Operative approach and postoperative effect. A. Preoperative identification; B. Position of Trocar (12 mm in the middle, 5 mm in the sides); C. Postoperative effect.*

The strap muscles midline was separated from the level of the thyroid cartilage to the sternal notch. Two silk treads were inserted to pull strap muscles. First of all, the isthmus of the thyroid gland was separated using ultrasonic shears to reveal the trachea. Then the inferior thyroid veins were coagulated with the harmonic scalpel to separate the lower pole of the thyroid from the upper pole of the thymus [2]. The inferior thyroid pedicle was lifted to keep a gentle traction upward. The inferior pedicle was carefully bluntly dissected to find the recurrent laryngeal nerve and the inferior parathyroid gland. After identification of the recurrent laryngeal nerve, the plane superficial to the nerve was delineated with an endo-dissector until the superior pole was reached. Then whole lobe was retracted downward and laterally. Berry's ligament was divided with the ultrasonic shears. When confronted with large glands, we advocate to block resection, which can effectively increase the operating space and reduce the risk of conversion to an open procedure. At last, the specimen was put in an endobag and extracted from the 12 mm trocar site. We should use the camera to observe carefully the puncture tunnel when returning the 12 mm trocar (Figure 2). Four patients in this series with active bleeding were immediately found around the tunnel, then we use gauze to press the corresponding skin to achieve hemostasis and avoid the risk of reoperation. The drainages were placed into the neck through each areolar incision. Continuous vacuum suction was set and removed when the amount of drain was less than 15 ml per day.

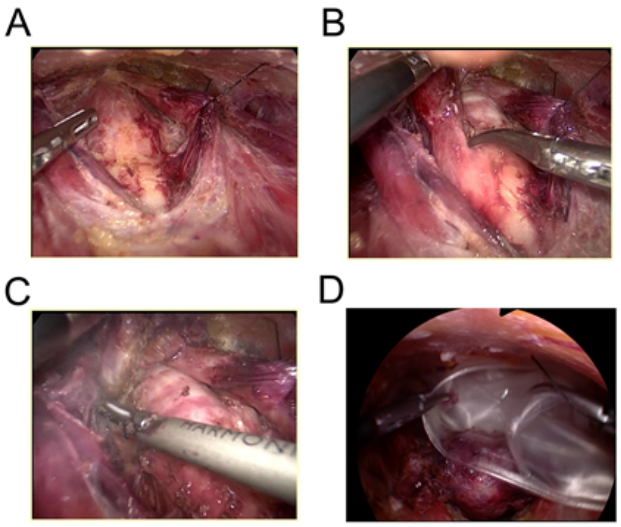

Figure 2. *Operation process. A. Anterior cervical muscle group were pulled; B. Treatment of inferior thyroid gland; C. Treatment of superior thyroid gland. D. Specimen was harvested.*

Results

The endoscopic thyroidetomy via improved breast areola approach were successfully performed in all 38 patients. There were 10 cases of lobectomies, 5 cases of subtotal thyroidectomy, 21 cases of side thyroidectomy with ipsilateral central compartment dissection, 2 cases of total thyroidectomy with bilateral ipsilateral central compartment dissection. There were no conversions to the open operation in this series. Final postoperative pathological diagnoses of the thyroid nodules were as follows: 5 cases of nodular hyperplasia, 2 cases of colloid lesion within a nodular goiter, 8 cases of follicular adenoma, 21 cases of unilateral micropapillary thyroid carcinoma (diameter less than 1 cm), 2 cases of bilateral micropapillary thyroid carcinoma. The number of lymph nodes resected was 4.17 ± 1.90 (range 1-8). In resected specimens, there were 3 patients with a parathyroid. The average operation time was 128.1 ± 25.8 min (range 65-195 min) (Table 1).

Table 1. *Postoperative results in patients after endoscopic thyroidectomy via improved breast areola approach.*

Postoperative diagnosis	
Nodular hyperplasia	5
Colloid lesion within a nodular goiter	2
Follicular adenoma	8
Unilateral micropapillary thyroid carcinoma	21
Bilateral micropapillary thyroid carcinoma	2

Operative procedures	
Lobectomies	10
Subtotal thyroidectomy	5
Side thyroidectomy with ipsilateral	21
central compartment dissection	-
Total thyroidectomy with bilateral	2
ipsilateral central compartment dissection	-
Number of lymph nodes	4.17 ± 1.90
Mean Operation time (min)	128.1 ± 25.8
Duration of drainage (days)	3.1 ± 0.6
Mean drainage volume (ml)	124.1 ± 41.7
Length of hospital stay (days)	5.29 ± 0.92
Postoperative complications	
transient RLN palsy	2
transient hypocalcemia	1
swallowing discomfort	1
chest wall paresthesias	3

The intact recurrent laryngeal nerve was exposed in all patients, and all suspected parathyroid glands were kept. All postoperative patients were able to endure the pain on chest wall and anterior cervical region. Analgesics were not routine used. Only a part of patients had mild subcutaneous emphysema. None of the patients developed hypercapnia. Postoperative complications included transient RLN palsy and hypocalcemia. Which were found in thyroid papillary microcarcinoma patients with total thyroidectomy ipsilateral central compartment dissection. Transient RLN palsy and hypocalcemia were resolved at 3 months and 8 days postoperatively, respectively. Other postoperative complications included one case with swallowing discomfort and three cases with chest wall paresthesias which lasted for about 4 months. One patient with scar constitution still had scar scleroma under subcutaneous tisuue of neck and chest wall at 6 month postopertation. The average drainage time was 3.1 ± 0.6 days (range 2-4 days), The average drainage volume was 124.1 ± 41.7 ml (range 50-200 ml). The average hospitalization length was 5.29 ± 0.92 days (range 4-8 days) postoperation. Postoperative follow-up includes the thyroid function, serum Tg assays and ultrasound assessment. There were no patients with hypothyroidism or papillary thyroid carcinoma recurrence in the follow up time. All patients were satisfied with the cosmetic effect (cosmetic satisfaction score 4.8 ± 0.4) (Figure 1C).

Discussion

It is well accepted that the incidence of thyroid cancer in males was lower than female. Research showed that the morbidity of thyroid cancer in females was about 4 times as in males. Glattre et al. [3] considered that thyroid cancer in females was associated with hormone levels, while in male patients it was associated with coastal high iodine diet, electromagnetic radiation or personal customs, such as smoking, drinking and environment. In recent years, the number of thyroid tumor needed operation treatment in males has increased rapidly. The postoperative quality of life, including cosmetic effect, was the major concerns of thyroid cancer patients [4]. With the development of cosmetic requirement in males, endoscopic thyroid surgery was also widely applicated in male patients. Since Huscher performed the first thyroid lobectomy in 1997, endoscopic thyroid surgery has evolved tremendously. When performing an endoscopic thyroidectomy, the site of approach is the most important factor in terms of cosmetic effect, invasiveness, safety, and feasibility [5]. It is difficult to treat the contralateral thyroid nodules via axillary approach [6], and the anterior chest wall approach would cause more hypertrophic scars than other approach [7]. Therefore, in recent years we used complete breast areola approach to perform endoscopic thyroidectomy.

As the skin pigment of areola is deep, the sugery will not cause obvious postoperative scar on the edge of the areola, therefore, the cosmetic effect of the complete breast areola approach is better than the other surgical technique. Moreover, through this surgical approch, the contralateral thyroid lobe could be easy explored. Endoscopic thyroidectomy via breast areola approach avoid the scar formation on the neck and anterior chest wall compared with other kind of approach. However, for male patients, due to the tightness of chest wall skin and the bad compliance which affects the operation flexibility, it is difficult to perform complete endoscopic thyroidectomy via breast areola approach in male patients. The technical difficulty of this surgery is the close distance between the right areola observation hole and auxiliary operation hole. The camera and the forceps are easy to collide, which influence the operation and increase the risk [8]. In previous study, 3 male patients were treated with complete breast areola endoscopic thyroidectomy, but we found that the accuracy and precision of the operation was not satisfactory. For example, the recurrent laryngeal nerve was hard to expose and there were also blind spots in some operation areas such as sternal lymph node. Therefore, we improved the breast areola approach. A 12 mm incision was made in the right areola at 4 o'clock position, at the same time, two 5 mm incisions were placed along the midpoint of the upper margin of both breast areolas (at about 11 o'clock position) to the sternoclavicular joint. In this way, we maximize the distance between the hole for camera and right dressing forceps, the adaptability of the two operating holes was also increased.

In male patients, the flap separation is more difficult, as the subcutaneous fat is thicker. When the separation is too deep, the ectopectoralis would be penetrated, which causes bleeding. But if the separation is too shallow, subcutaneous ecchymosis would be caused. In our experience, the follicles expansion after epinephrine solution subcutaneous injection, was used to determine whether the separation was shallow or deep. The layer of fat was left above the flap. The separator with special arrow shape should not exceed the level of the thyroid cartilage, which could significantly reduce postoperative neck

pain. Sugeons with experience and training are required in this operation. Jeryong K et al. [7] demonstrated that the endoscopic thyroidectomy was no more time consuming than traditional open thyroidectomy by trained surgeons. In the course of operation, when we encountered larger glands that blocked resection, precision separating forceps were used to reduce the clamping action, which enlarge the operating field and increased the surgery safety. The used of ultrasonic scalpe in the proximity close to the recurrent laryngeal nerve should be reduced to avoid unexpected damage. In addition, neural detectors and Carbon Nanoparticles could also be used to ensure the operation safety.

In our study, to avoid postoperative bleeding, the 5 mm trocar was removed under direct vision, and the 12 mm trocar was removed under camera observation. Active bleeding in the tunnel was found in four cases, which was restored by gauze compression. There were no patients needed re-operation caused by postoperative bleeding. Moreover, longer drainage catheter with side holes was introduced in our study, the fluid from thyroid fossa and subcutis could both be drained, which prevented the postoperative subcutaneous effusion and edema. There are also some limitations in our paper. First, the sample size is small. Further research with larger sample size is needed. Second, there is no control group under traditional operation in this study. Third, prospective evaluation was not performed in this study and long-term follow-up daten were not provided. In conclusion, the application of endoscopic thyroidectomy via improved breast areola approach in male patients with thyroid tumor is safe and feasible. It is also suitable for bilateral thyroid disease. It may also become the main procedure of choice for male patients who has the cosmetic requirement.

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