

## TECHNICAL SECTION

# Scarless Endoscopic Thyroidectomy - Techniques & Tribulations

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## ABSTRACT

In this article, we elaborate on the two different techniques that we have utilized for removing the thyroid from the neck, which we have been performing for the last 12 years. Data analysis of all 61 cases performed in the last 5 years are also presented. The background, history, and current status of endoscopic thyroidectomy are also addressed.

## INTRODUCTION

Since video assisted thyroidectomy, first done by Miccoli et al<sup>1</sup>, reached the surgical arena, endoscopic thyroidectomy took off fairly rapidly, and has been done more by general surgeons than by the endocrine surgeons. The reason for this reluctance of the specialist surgeon to adopt the new technology is clear, there is already a definite and uncomplicated surgery for excision of part or whole of the thyroid through a fairly cosmetic incision in the anterior aspect of the neck. However the technological innovations of endoscopic surgery have permitted surgeons to access the thyroid quite comfortably, both from the axilla and the chest wall, and to then remove the same without any visible skin incision.

## MATERIALS & METHODS

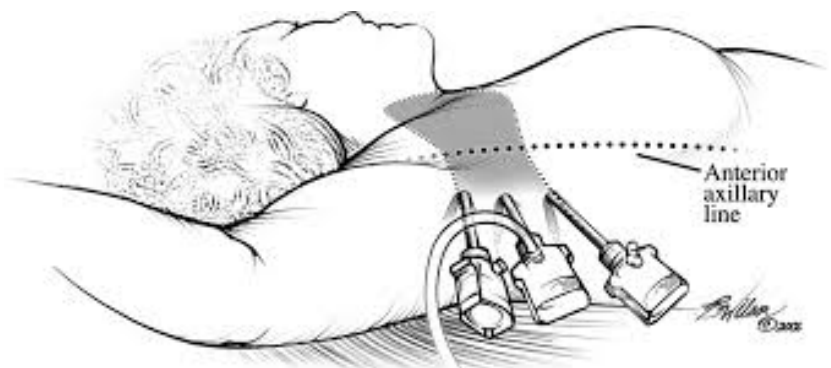
We did a retrospective analysis of our 61 endoscopic thyroidectomy patients done over the 7 year period (2009 to 2016). We have opted for one of two methods in the procedure, either transaxillary hemithyroidectomy or bilateral breast access (BLB) for total thyroidectomy. We had a total of 15 cases who needed total thyroidectomy, and 46 cases who required hemithyroidectomy. In this entire series, there have been no recurrent laryngeal nerve injuries, and tracheal or oesophageal injury. The major post operative patient disabilities were limited to pain in the axillary chest wall areas and, in a small fraction, subcutaneous emphysema. In this article we describe in detail the technique of endoscopic thyroidectomy as adopted in our institution.

## CASE DISTRIBUTION

The total thyroidectomies were all performed for multinodular goiters (15 patients) bilateral visualization, dissection, and removal of the thyroid was facilitated by the approach through both the mammary gland, and the pathology found in the 46 cases was as follows: adenoma 22, dominant nodule 13, papillary carcinoma 1<sup>5</sup>, recurrent cyst in the thyroid 9, Hashimotos with nodularity 1 case.

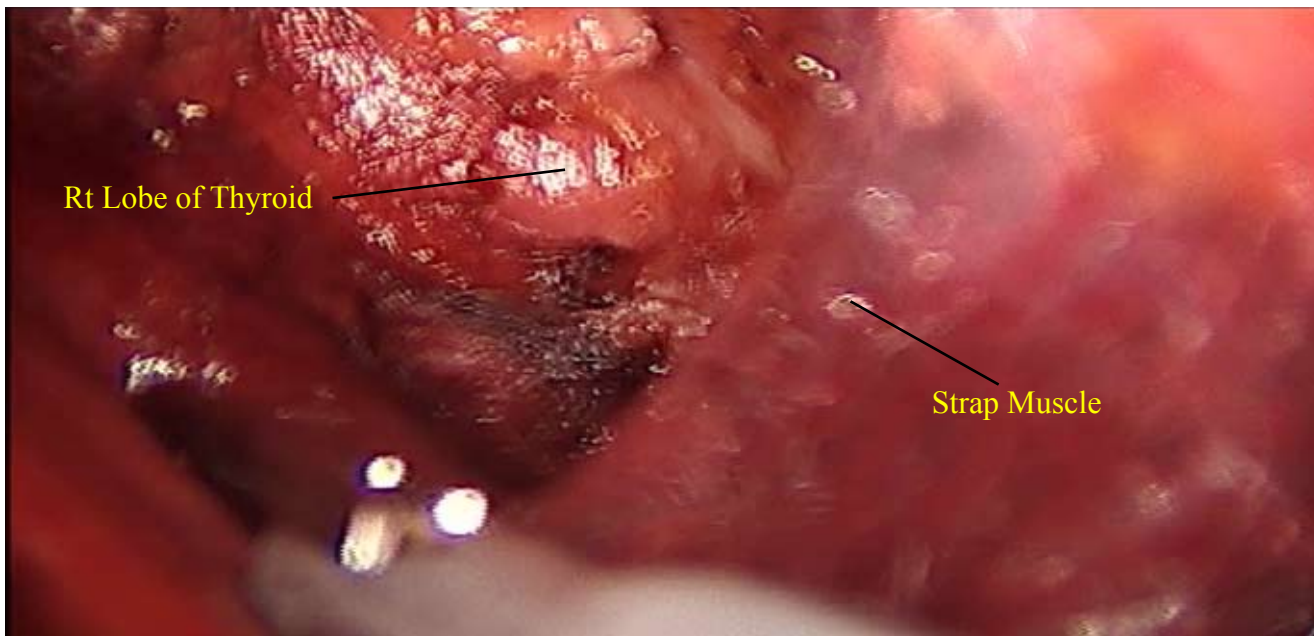
## TECHNIQUE

For patients with unilateral disease of the thyroid we opted for transaxillary approach<sup>2</sup> (46 patients). The position of the patient is supine, the neck not extended very much (as one needs to have a laxity in the platysma and the subplatysmal tissue). The right arm is abducted at the shoulder and flexed at the elbow. The arm is secured in such a manner as to not hyper abduct and cause brachial plexus traction injuries. Three port incisions are made just behind the anterior axillary line. An initial space in the subcutaneous plane is made by inserting a suction cannula with the thumb finger stall of the glove tied onto it with silk. Inflation with 200 to 300cc of saline into the gloved finger is easily possible. This is used to create a hemostatic tunnel between the axilla and the clavicle. The pressure of the gloved finger stall on the tissues



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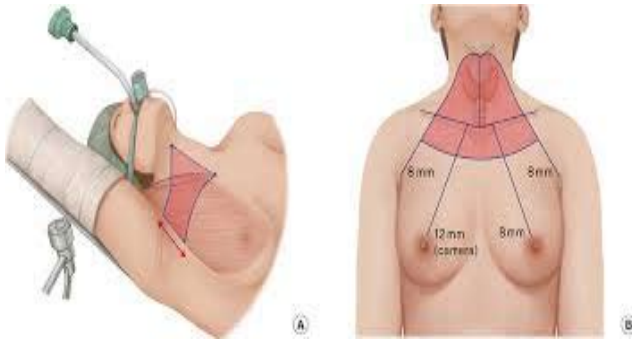
prevents small bleeders etc. After the initial space is dissected with the fingers of the glove the other two ports are put on either side of the central (or optical) port. Thus the final configuration shows a 10mm trocar centrally, with two 5mm trocars. Frequently one of the 5mm trocars is converted into a 10mm port in order to facilitate specimen extraction, and also to bring in gauze into the space for hemostasis.

This space is progressively developed from the axilla all the way upto the clavicle. A little pressure on the skin over the clavicle allows the surgeon to expand the space accordingly. Once the clavicle is reached then the line of dissection moves towards the midline, with the finger on the goiter pressing up and down intermittently, to indicate the direction of dissection. Before moving on to the neck, we make sure that the entire subcutaneous space is opened out, hemostatically dissected, and permits both the working instruments to freely move into it. This often requires pressure of about 12mm, though most of the operation is performed with the pressure of 8 to 10mm mercury. After the clavicle is reached the dissection is taken in the subplatysmal plane, using either the ultrasonic scissors or the cold steel of the regular laparoscopic Metzenbium scissors. Meticulous hemostasis is important all the way to prevent any unnecessary oozing and colouring of the thyroid, which may cause obliteration of clear tissue planes. Once the subplatysmal plane is developed upto the midline the entire strap muscle network is seen lying on the thyroid, and stretched out by the thyroid (see figure). At this point of time the strap muscles are transected over the central prominence of the nodule, and the

dissection is commenced laterally as the strap muscles are retracted and thyroid nodule is caught with the finer claw forceps and rotated medially, the recurrent laryngeal nerve is clearly seen on the surface of the trachea. After dissecting out the recurrent laryngeal nerve, the rest of the entire dissection is kept medial to the recurrent laryngeal nerve and in a more superficial plane. Thus, identifying the most important structure at the beginning of the operation helps to preserve the recurrent laryngeal nerve. Along with the RLN, the parathyroids are identified, and the tubercle of Zuckerkandl. The fact that there is a posterolateral approach to the thyroid gland very clearly permits us to do the same.

After the parathyroids are identified, the dissection is commenced along the inferior pole of the thyroid, where the leash of inferior thyroid vessels enters the capsule of the gland. Each vessel is taken individually and independently just before it enters the gland, and the ultrasonic shears tackle the vessels efficiently. The inferior pole of the gland, and the lower lobe of the gland are progressively developed, moving the pretracheal fascia away from the gland itself. This is done until the entire isthmus is clearly visualized under the strap muscle. Sometimes the division of the strap muscles may be extended to the contralateral side in order to clearly visualize the junction of the isthmus with the opposite lobe of the thyroid gland.

At the junction of the contralateral lobe and the isthmus of the gland, the isthmus is cut across hemostatically. At this point of time the metal or active blade of the harmonic is kept on the thyroid and the indifferent electrode or inactive



blade is against the anterior wall of the trachea. This prevents tracheal injury. Further dissection is permitted to harmonize the middle thyroid vein, and this plane is further dissected, keeping the recurrent laryngeal nerve under vision, until the upper pole is reached. At the upper pole the superior thyroid vessels sinking into the capsule of the thyroid are picked off one by one, exactly as they are picked up in the lower part of the thyroid.

Perfect hemostasis is obtained all around, and the parathyroid, RLN are examined once more, and the specimen is put into an endo bag. An endo bag is made by ETO sterilising our cap and mask bag, and with a simple 2-0 silk sutured around the same. With this the specimen put into the indigenous endo bag, a purse string of silk pulled through and specimen removed by grasping the bag with the 10mm crocodile forceps and removal through the left or the right ports which contains the 10mm trocar. This is the procedure of transaxillary endoscopic hemithyroidectomy.

### TOTAL THYROIDECTOMY

For total thyroidectomy we were earlier using the complete chest wall sternal approach, but ugly keloids were found in a few cases. Therefore for the last 7 years we adopted the bilateral breast approach<sup>3</sup>. In this approach we use the areolae of both the breast as 10 and 5mm working hand ports. The central 10mm port is put into the medial aspect of the breast, in relation to neck line of the lady and we use the 10mm optical port through the medial aspect of right of the breast. Detailed chest wall dissection is performed from the level of the breast just above the mammary gland just superficial of the mammary gland and deep to the subcutaneous tissue, until the suprasternal notch and the clavicle are reached on both sides.

Extensive dissection sometimes causes postoperative bruising and subcutaneous emphysema in total thyroidectomy patients. However, we find there is excellent visualization and access of both the lobes of the thyroid. As in the transaxillary thyroidectomy, we keep the neck in the neutral position, without flexion or

extension, in order to facilitate cervical dissection. Both the upper limbs are kept closely abducted out of the chest wall like in the anatomical position, with gentle traction downwards so as to increase the space of the neck. Sufficiently large space of access is obtained, and the dissection extends from the breast towards the sternoclavicular joint and to the neck. The right and left sternomastoid muscles are used as indexes for the dissection, and the subplatysmal plane entered just medial to both the sternomastoid junction. For chest wall thyroidectomies we tend to use a 45 degree telescope, which gives us a helicopter view, which is a direct top down view of the anterior surface of the gland. The strap muscles are divided hemostatically using ultrasonic scissors, and thyroid is accessed through lower pole. Once more the inferior thyroid vessels are first taken up along the complete lower pole, all the way from one to another to facilitate the upwards lift and rotation of the thyroid, which takes the thyroid away from the anterior surface of the trachea. Throughout this operation, we persist with the coagulation setting after ultrasonic scalpel and with medial traction lobes of the thyroid, both middle thyroid veins are harmonised. There is no need to clip or tie these veins, instead using the ultrasonic scalpel on coagulation with mode 1. Finally the superior pole is taken very close to the thyroid gland and if there is any worry about the superior thyroid artery we tend to use the hemo lock clip in order to secure the vessel. The remaining attachments to the trachea are dealt with by ultrasonic dissection and the thyroid gland is grabbed in the crocodile bag and put into an endo bag and then progressively pulled down into the intraclavicular compartment, after which it exits easily either through the central port, in which case we shift the telescope to the areola, or by extension of the circum areola cut, which permits a surprisingly large specimen to be removed transmammarily. One of the areolae is used to insert a small drainage tube, which we remove in 1 or 2 days.

### DISCUSSION OF VARIOUS TECHNIQUES

Actually, so called scarless endoscopic thyroidectomy<sup>4</sup> is a very aggressive procedure involving dissection of large tissue planes and often having a large amount of subcutaneous emphysema (we altogether had 14 of 61 patients having uncomfortable post operative subcutaneous emphysema, but it settled down within 8 hours) The post operative pain in several series is also found to be more but what is without doubt is that *we were able to remove the thyroid without any scar in the neck.*

Although there is a dearth of literature in terms of controlled trials, or even prospective

studies, with almost all the available papers being (including this) being retrospective, the comparative data seems to indicate that the patients are overall very satisfied in 30 days time with the quality of the operation and with the lack of scar in the neck<sup>6</sup>.

What is patently true, however, is that, like adrenalectomy and enucleation of pancreatic endocrine tumors, thyroidectomy and parathyroidectomy are not undertaken through endoscopic route by the majority of endocrine surgeons, both in India and abroad, simply because of the comfort zone in open surgery. Although academically one could argue that the last 10 years of endoscopic thyroid and parathyroid excision still requires statistical validation before adoption as routine practice, it is fair to say that that very validation will happen in an accelerated manner only if there is a wide spread deployment of the endoscopic route by the fraternity of endocrine surgeons.

This article is essentially a technical one, with details on ports, spaces dissected, etc, but with the background clarion call to the entire fraternity to adopt and utilize the marvelous innovation of endoscopic surgery, to the bigger benefit of both the patient and surgeon!

## REFERENCE

- 1) *Current Concepts In Endocrine Surgery*, Langenbeck's Archives of Surgery, April 2006, Volume 391, Issue 2, pp 68-71, First online: 30 March 2006, Video-assisted thyroidectomy: indications and results - Paolo Miccoli,, Piero Berti, Gian Luca Frustaci,, Carlo Enrico Ambrosini, Gabriele Materazzi
- 2) *Clinical benefits in endoscopic thyroidectomy* by the axillary approach, Yoshifumi Ikeda, Hiroshi Takami, Yuzo sasaki, Junichi Takayama: DOI: 10.1016/S1072-7515(02)01664-4
- 3) *Scarless Endoscopic Thyroidectomy: Breast Approach for Better Cosmesis*, Ohgami, Masahiro, Ishii, Seiichiro, Arisawa, Ohmori, Tai;
- 4) Video assisted endoscopic thyroidectomy; Ta-Sen Yeh, Yi-Yin Jan, Brend Ray-Sea Hsu; DOI: 10.1016/S0002-9610(00)00429-3
- 5) *Endoscopic Thyroidectomy for Thyroid Malignancies: Comparison with Conventional Open Thyroidectomy*; World Journal of Surgery, December 2007, Volume 31, Issue 12, pp 2302 - 2306; Yoo Seung Chung, Jun - Ho Choe, Ky ung-Ho Kang, Seok Won Kim
- 6) *Endoscopic Thyroidectomy: Our Technique*; Shailesh P Puntambekar, Reshma J Palep, Anjali M Patil, Neeraj V Rayate, Saurabh N Joshi, Geetanjali A Agarwal, and Milind Joshi; J Minim Access Surg. 2007 Jul-Sep; 3(3): 91-97. doi: 10.4103/0972-9941.37191