

# *Endoscopic Thyroidectomy by Axillary Approach : First Consecutive 6 Cases in Rajavithi Hospital*

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## **Abstract**

**Background :** Transverse surgical scar after conventional thyroidectomy is one of the unavoidable problem. Endoscopic thyroidectomy performed via the axillary approach leaves no scarring of the neck and anterior chest wall thus provides an excellent cosmetic results. The axillary scars usually are not seen in normal arm position.

**Methods :** From 10th April 2001 - 31st May 2001, we performed 6 cases of lobectomy and isthmectomy by this technique. One 10-mm port for semi-rigid endoscope and three 5-mm ports for instruments and suction were inserted on the same side of diseased thyroid lobe . The CO<sub>2</sub>-insufflation pressure was set below 4-mmHg and dissection mainly using an ultrasonically activated shears.

**Results :** All 6 patients were successfully performed with no conversion to conventional technique. Mean operating time was 253 minutes and blood loss was 143 ml. Recurrent laryngeal nerves were clearly identified in every cases and no voice changes after surgery was observed. One case developed a 20 ml seroma on 10th postoperative day and was treated by simple aspiration. The patients were discharged at 6.3 postoperative day by average.

**Conclusion :** Endoscopic thyroidectomy by axillary approach for benign thyroid diseases are feasible, safe with better cosmetic results.

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The common indication for thyroidectomy in a patient with thyroid nodule is to exclude a neoplasm, especially malignancy. But the final pathologic report often proves to be benign in spite of indeterminate pre-operative cytology examination of materials obtained from fine needle aspiration biopsy.<sup>1</sup> Even though the morbidity and mortality rate for thyroidectomy currently is low, the exposed transverse surgical scar at the neck is unavoidable. Because of life long cervical scar, some patients have both psychological effects and loss of self confidence when exposed public.

After the world wide development of laparoscopic surgery in many fields, its use has been extended to various procedures performed outside the usual body cavities, such as neck,<sup>2,4</sup> axilla,<sup>5,6</sup> preperitoneum,<sup>7</sup> and retroperitoneum.<sup>8,9</sup>

The newer models of endoscopic instruments and accessories are of smaller sizes that enable cosmetic results. So far, the axillary approach for thyroidectomy was employed in only two reports in the literature, by the same group from Japan.<sup>10,11</sup> We performed endoscopic thyroidectomy in 6 consecutive cases by ipsilateral axillary approach with some modifications of the previously described technique.

## **PATIENTS AND METHODS**

From 10<sup>th</sup> April 2001 to 31<sup>st</sup> May 2001, six consecutive cases of endoscopic thyroid lobectomy and isthmectomy were performed using axillary approach (Table 1).

There were 4 women and 2 men with age ranged

Table 1

No.	Sex	Age	Clinical Dx.	Site	Size of Lesion (cm.)	Preop FNA	Pathological Findings
1.	F	27	cold. nodule	Rt.	3.0	Follicular neoplasia	Follicular adenoma
2.	F	49	cold. nodule	Lt.	4.0	Negative for malignant cell	Adenomatous goiter
3.	M	66	cold. nodule	Lt.	2.0	Negative for malignant cell	Nodular goiter
4.	F	49	cold. nodule	Rt.	4.5	Negative for malignant cell	Adenomatous goiter
5.	F	60	cold. nodule	Rt.	4.0	Negative for malignant cell	Follicular adenoma
6.	M	22	cold. nodule	Rt.	4.0	Negative for malignant cell	Follicular adenoma
Avg.		38			2.97		

\*FNA = Fine Needle Aspiration biopsy

from 22 to 66 years (mean, 45 years). All patients were diagnosed pre-operatively as single thyroid nodule by clinical examination, thyroid scan and ultrasonography. The maximal diameter of the nodules ranged from 2.0 cm to 4.5 cm (mean 3.6 cm). The pre-operative fine needle aspiration biopsy results were negative for malignancy in 5 patients and follicular neoplasia in one case. The results of screening serum thyroid hormones and TSH levels were normal.

Under general anesthesia with endotracheal intubation, the patients were placed in supine position. The neck was slightly extended and the ipsilateral axilla of the diseased lobe was exposed by raising that arm over the head and flexed 90° at elbow (Figure 1).

A 10-mm skincrease incision was made at mid portion and 1-cm below the anterior axillary fold for camera port. By sharp and blunt dissection, a subplatysmal space just anterior to pectoral fascia was created directly to the neck. Another two incisions of 5-mm for instruments were made on both sides of the first incision, 3-4 cm apart, and 2-3 cm below the anterior axillary line. Also the fourth 5-mm incision about 2 cm below the camera port was made for suction port. The maximal CO<sub>2</sub> insufflation pressure was set at 4 mmHg.

The semi-rigid endoscope was used and the main dissection instrument used was 5 mm ultrasonically activated scalpel. The tunnel was created until the anterior border of the sternocleidomastoid muscle was clearly seen. Dissection of the sternothyroid to lift it from anterior thyroid capsule was made. At this step, the border and belly of the sternocleidomastoid muscle was displaced downward for gaining exposure by using the suction instrument. In this first 6 cases, the strap muscles were divided at the midportion for exposure. The inferior pole of the gland was freed from surrounding tissues and the inferior thyroid vein was

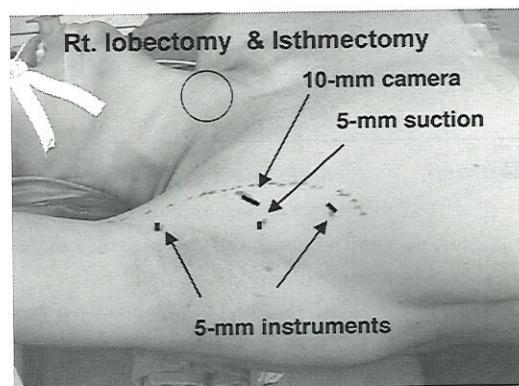


Fig. 1 Photograph demonstrate the locations of ports in a patient prepared for right lobectomy and isthmectomy.

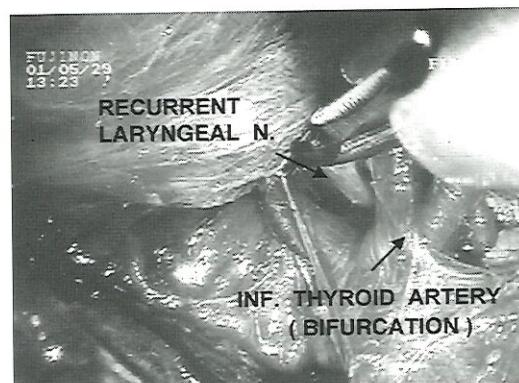
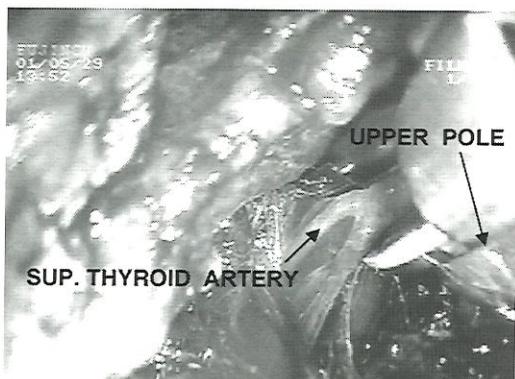
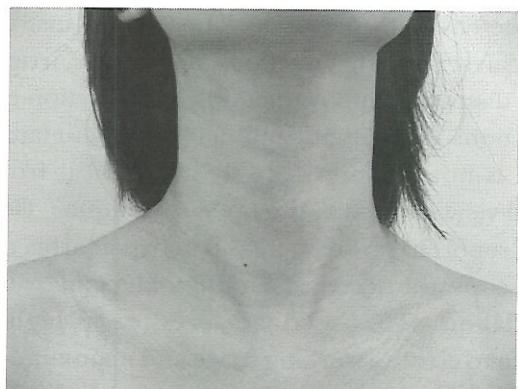


Fig. 2 Photograph show the anatomic relations between the right recurrent laryngeal nerve and the bifurcation of inferior thyroid artery.

divided close to the thyroid gland. By pushing and lifting the inferior pole towards midline, the lateral portion of the thyroid gland was exposed. The small middle thyroid vein was identified and divided. At this point, with greater care, by blunt and sharp meticulous dissection, the inferior thyroid artery was identified together with the recurrent laryngeal nerve in their usual anatomic relations (Figure 2).



**Fig. 3** Photograph showing the superior thyroid artery was skeletonized before dividing it by Harmonic scalpel.



**Fig. 4** Appearance of neck 14 days after operation.

**Table 2** Data of blood loss, operative time, drainage and postoperative stay

No.	Blood Loss (ml)	Vacuum Drain (ml)	Day in Place	Operative Time (minute)	Post-op. Stay (day)
1.	200	140	2	310	3
2.	150	200	4	240	6
3.	100	490	6	245	9
4.	130	290	8	245	10
5.	140	180	5	280	7
6.	140	240	2	200	3
Average	143.3	256.7	4.5	253.3	6.3

After division of inferior thyroid artery, the thyroid gland was lifted upward and medially for freeing off the trachea by cutting the suspensory ligaments. The isthmus was divided close to the opposite lobe. Dissection was carried further until the gland was attached only by its superior part. Finally, the gland was tracted downwards and the superior thyroid artery and vein were skeletonized and divided (Figure 3).

Then, the entire resected specimen was gradually removed through the camera port and sent for pathologic study. The strap muscles were re-approximated with 3-4 interrupted absorbable sutures. One closed suction drain was placed under the muscles and skin incision were closed by subcuticular sutures.

## RESULTS

All six patients successfully underwent endoscopic thyroidectomy with no conversion. Standard anesthetic monitoring, i.e. blood pressure, heart rate, oxygen saturation, EKG, were stable during the surgery in every patients. There was no intraoperative complication.

Table 2 showed data of blood loss, operative time, drainage and postoperative stay. The mean operative

time was 253.3 minutes (range, 200-310 min). Average blood loss was 143.3 ml (range 100-200 ml). No subcutaneous emphysema and no pneumomediastinum developed. The immediate postoperative period were uneventful without bleeding or recurrent laryngeal nerve palsy. Postoperative pain was minimal and all patients could start oral intake on the first postoperative day. Average total drainage volume was 256.7 ml (range 140-490 ml). The closed suction drain were removed at 4.5 days (range, 2-8 days). All patients were discharged on 6.3 day by average (range 3-10 day).

There was no cervical scar and the axillary scars were completely hidden in the axilla while the patients arm hanging down in normal standing position. All patients stated that they were very satisfied with the cosmetic results (Figure 4).

## DISCUSSION

The life-long transverse cervical scar from conventional "open" thyroid surgery is unavoidable effect. This endoscopic thyroidectomy by axillary approach gives better cosmetic results. Ikeda et al<sup>10,11</sup> published this approach by using 3 ports. Our group found that with the aid of the fourth suction port, the operation

became easier to perform. The suction instrument itself can serve many functions, i.e. suction, irrigation, blunt dissection and retraction-counteraction during dissections. The identification of recurrent laryngeal nerve is not difficult since we also find it from the lateral view same as in the open technique. Gottlieb et al<sup>12</sup> reported severe increases in hypercarbia during endoscopic transcervical parathyroidectomy with CO<sub>2</sub> insufflation. They used CO<sub>2</sub>-pressure as high as 20 mmHg to create a working space and maintained at 15 mmHg or higher during the operation. Rubino et al<sup>13</sup> studied in a large animal model and concluded that severe increased of intracranial pressure occurred with insufflation pressure higher than 15 mmHg. There were no change with lower insufflation pressure up to 10 mmHg and they recommended this pressure level was safe. Ochiai et al<sup>14</sup> performed five cases of endoscopic hemithyroidectomy by using CO<sub>2</sub> insufflation pressure at 6 mmHg. Their group found that the patients were safe up to 370 minutes time of surgery. In our study, we used lower CO<sub>2</sub> insufflation pressure, i.e. 4 mmHg and found no CO<sub>2</sub>-related problem like Ikeda.<sup>10,11</sup> There was one case of 20 ml seroma detected on the 10th postoperative day and treated by simple aspiration.

Some authors approached the thyroid gland through the breasts and anterior chest wall incisions,<sup>15,16</sup> suprasternal notch,<sup>17,18</sup> or precordial region.<sup>19</sup> The main disadvantage of this approach is the difficulty identifying the contralateral lobe of the thyroid gland. It is hope that the operative time should be reduced after the learning period as in other laparoscopic procedures.

## CONCLUSION

Endoscopic thyroidectomy by axillary approach is technically feasible and safe. The patients gained better cosmetic results, but the real benefit should be measured against the increase in time consumed and expense. In the future, this approach may be an alternative to the traditional neck procedure.

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