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Original Article

Comparison of Endoscopic (Breast-axillary Approach) Versus Conventional Open Thyroid Lobectomy

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Abstract

Objective: **To compare the outcomes and complications of endoscopic versus conventional open thyroid lobectomy**

Patients and Methods: **A retrospective, group-matched control study was performed in 148 patients who underwent thyroid lobectomy at the institute by one surgeon (the author) between October 2008 and September 2014.**

Results: **Endoscopic thyroidectomy (ET) was done successfully in 71 patients with a median age of 40 years and median tumor size of 3 cm. Conventional open thyroidectomy (OT) was done in 77 patients with a median age of 42 years and median tumor size of 4 cm. There were no significant differences in sex, age, side of tumor between the two groups. Median operative time was significantly longer in the ET group at 120 min (range 50 to 180) vs. the OT group at 75 min (range 50 to 130), $p < 0.05$. Median postoperative pain score, rated from 1 to 10, was significantly less in the ET group at both 24 hours and 48 hours, and blood loss was significantly less in the ET group (both p-values < 0.05). Median postoperative hospital stay in ET group was shorter than that in the OT group: 3 days (range 2 to 5) vs. 4 days (range 2 to 6) respectively ($p < 0.05$). There was no significant difference in the complication rates, but the cosmetic satisfaction was significantly superior in the ET group.**

Conclusion: **ET (breast-axillary approach) is safe and superior to OT in terms of postoperative pain, blood loss, hospital stay, and cosmesis for patients undergoing thyroid lobectomy.**

Keywords: **Endoscopic thyroidectomy, Open thyroidectomy, Outcomes**

Introduction

Nodular goiter is a very common condition in the North-East region of Thailand. The conventional treatment is open thyroidectomy (OT) but post-operative pain and unpleasant surgical scar due to a long incision in the neck area are still of concern. To avoid these problems, the first endoscopic thyroidectomy (ET) was introduced in 1998[1-4]. There are many approaches to ET, such as the anterior cervical, lateral cervical, chest wall, breast, axillary and the breast-axillary approach[5,6,23,30]. Many studies have shown that ET can avoid unpleasant-looking scars by hiding them, and also lessen postoperative pain[7,8,9,10]. The breast-axillary approach to ET can successfully

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hide the surgical scar in the axillary and periareolar area. This approach also creates a comfortable working-space, and for this reason it is the author's preferred technique. The present study reports the comparison of outcome and complications arising from ET as compared to those from conventional OT.

Patients and Methods

Patients who underwent thyroid lobectomy under general anesthesia for the treatment of single thyroid nodule at Maharat Nakhon Ratchasima Hospital by one surgeon (the author) between October 2008 and September 2014 were included in the present study. The only exclusion criterion was a pre-operative proof of thyroid carcinoma.

A retrospective, group-matched control study was performed by matching conventional OT and ET patients. OT was performed using standard techniques. For the ET technique, patients were placed in the supine position, with the arm raised above the head. Two ports, of sizes 5 and 10 mm, were placed at the anterior axillary line near the shoulder and at the axillary area, respectively. A third 5mm-port was placed at the periareolar area of the breast (Figure 1). Then a subcutaneous tunnel was created, and a working space was established with CO_2 insufflation at a pressure of 6 to 8 mmHg.

Ipsilateral strap muscles were split longitudinally to expose the thyroid gland. The Harmonic Scalpel was used for dissection and tissue division. The recurrent laryngeal nerve was routinely identified and preserved (Figure 2). When thyroid lobectomy was done, a retrieval bag was used for extraction of the gland through the axilla. A vacuum drain was usually placed at the operative site. All incisions were closed with subcuticular sutures.

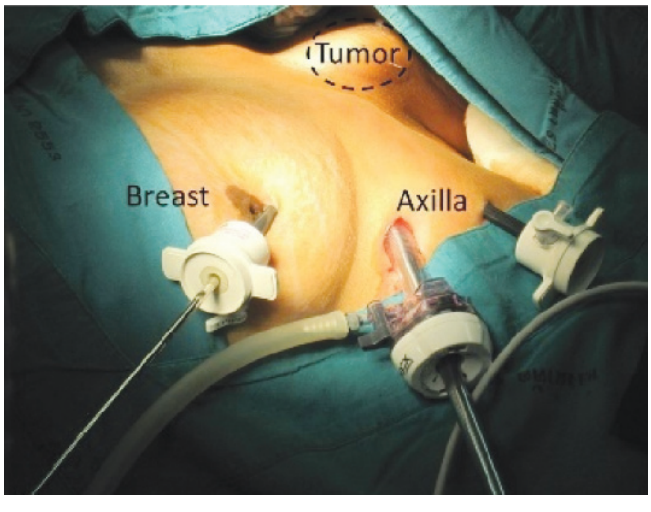

Figure 1 Showing the breast-axillary approach to endoscopic thyroidectomy.

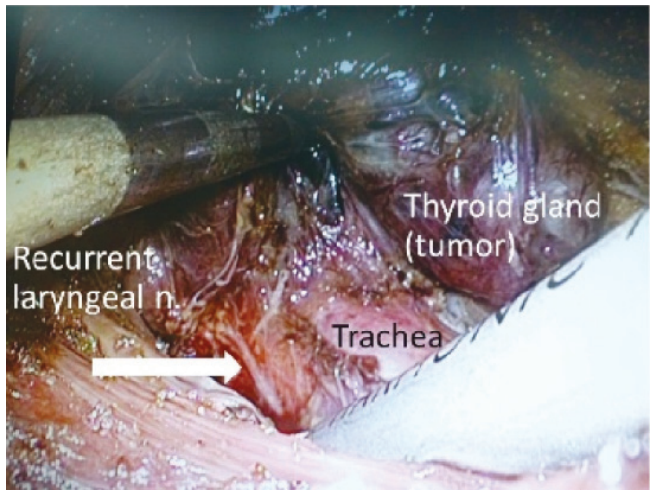

Figure 2 Demonstrating the recurrent laryngeal nerve seen on endoscopy

Clinical data collected included age, gender, tumor size, operative time, postoperative pain, blood loss, length of hospital stay, operative complication, and cosmetic satisfaction. Postoperative pain was assessed by a visual analog scale method, with scores between 1 to 10, at 24 and 48 hours after the operation. Cosmetic satisfaction was evaluated after 8 weeks by a verbal response scale. The scale had 5 responses, from 1, very dissatisfied, to 5, very satisfied. Statistical analysis was performed by using the chi-square test, Mann-Whitney U test, Fisher's exact test as appropriate. A *p*-value less than 0.05 was considered statistically significant.

Results

A total of 148 patients were included in the present study. ET was done successfully in 71 patients, with a median age of 40 years, and a median tumor size of 3 cm. Conventional OT was performed in 77 patients, with a median age of 42 years, and a median tumor size of 4 cm. There was no significant difference in sex, age, side of tumor, but the tumor size was significantly larger in the OT group (Table 1).

Table 1 Comparing demographic and baseline data between open and endoscopic groups

	Open group (N = 77)	Endoscopic group\ (N = 71)	*p*-value
Women: no.	69	67	0.290
Men: no.	8	4	
Age, yrs: median (range)	42 (16 to 66)	40 (14 to 69)	0.470
Right side: no.	35	39	0.249
Left side: no.	42	32	
Tumor size, cm: median (range)	4 (2 to 6)	3(1 to 6.5)	< 0.05

Table 2 Comparing the outcomes between open and endoscopic groups

	Open group N = 77	Endoscopic group N = 71	*p*-value
Operative time, mins: median (range)	75 (50 to 130)	120 (50 to 180)	< 0.05
Post-op pain score, from 1 to10			
At 24 hours: median (range)	7(4-10)	4(1-8)	< 0.05
At 48 hours: median (range)	4(1-8)	2(0-5)	< 0.05
Blood loss, mL: median (range)	50 (5 to 350)	10 (10 to 400)	< 0.05
Hospital stay, day: median (range)	4 (2 to 6)	3 (2 to 5)	< 0.05
Complication, no.	13	13	0.82
Bleeding	2	2	0.99
Seroma	1	2	0.48
Infection	0	1	0.48
Injury	0	1	0.48
Hoarseness(transient)	7	4	0.42
Numbness	3	2	0.99
Hyperesthesia	1	1	0.99
Chronic pain	1	0	0.99
Cosmetic satisfaction, from 1 to 5			< 0.05
1 to 3	39	1	
4 to 5	38	70	

The median operative time was 120 minutes (range, 50 to 180) for the ET group, and 75 minutes (range, 50 to 130) for the OT group. This difference was statistically significant ($p < 0.05$). The median postoperative pain scores in the ET group at 24 hr (4) and 48 hours (2) were significantly less than those in the OT group (7 and 4, respectively) at $p < 0.05$. Median blood loss in the ET group was also less than that in the OT group (10mL vs. 50 mL, $p < 0.05$). The median postoperative hospital stay in the ET group was shorter than that in the OT group as well (3 days vs.4 days respectively, $p < 0.05$) (Table 2).

Rates of operative complications were not significantly different between the two groups (Table 2). Bleeding was found in two cases in both groups during the early postoperative period, but all ceased spontaneously. Seroma occurred in a few cases, but all resolved within one month, although in one case in the ET group needle aspiration was required. Transient voice hoarseness was found in both groups, with no significant difference. No permanent vocal cord paralysis was found in this study.

Cosmetic satisfaction was categorized into two groups. The first group had a high level of satisfaction (scores 4 to 5) and the second group had a low level of satisfaction (scores 1 to 3). Patients in the ET group had significantly higher satisfaction scores (Figure 3). After mean follow up time of 30 months and 24 months

Figure 3 Comparing the cosmetic outcomes of open (OT) versus endoscopic (ET) operations

in the ET and OT groups, respectively, no recurrence was found.

DISCUSSION

Thyroid surgery, with over 100 years of development, is now a very safe operation[11]. Traditionally, nodular goiter was treated with open surgery, but the associated postoperative pain and unpleasant surgical scar are still of concern. Minimally invasive surgery has been widely adopted for over two decades, and thyroid surgery has been under its influence as well. Benefits of minimally invasive surgery include less postoperative pain, smaller surgical scar, and faster recovery[12]. Thus, minimally invasive thyroid surgery, or ET, should solve the remaining problems of open thyroid surgery.

In the present study, patients in both open and endoscopic groups were similar in terms of sex, age, and side of tumor, but tumor size was significantly larger in the open group. Tumor size, however, does not seem to affect the performance of thyroid operations[24].

Operative time in the open group was shorter than that in the endoscopic group because of the complexity of the ET technique to approach and remove the thyroid gland. Similar findings were seen in many studies[25]. But after the 25th ET case[13,28], as was also observed in the present study, the operative time significantly decreased and remained constant at about 90 minutes. In terms of blood loss, there was significantly less blood loss in the ET group. Postoperative hospital stay in the ET group was also significantly shorter. A shorter hospital stay may shift the cost of ET more towards that of OT[21].

Complications in both groups were not significantly different, a conclusion similar to that of other studies[14,29]. Transient hoarseness may be due to temporary neurapraxia of the recurrent laryngeal nerve, from the effect of mobilization and diathermy or Harmonic scalpel during thyroid dissection. There was no permanent recurrent laryngeal nerve injury in this study. The rate of recurrent laryngeal nerve injury noted from previous studies ranged from 0.3 to 2.1%[15]. Prevention of nerve injury during surgery includes carefully identifying the recurrent laryngeal nerve before ligation, stretching, crushing or electrocauterization near the area of this nerve[16,17].

A few cases of bleeding, seroma, wound infection, hyperesthesia, and chronic pain were seen in the present study. There was one case of injury to the external jugular vein during ET, but luckily the bleeding stopped spontaneously.

In the present study ET patients had less postoperative pain than OT patients, both at 24 and 48 hours after operation. This finding agreed with those seen in other studies[14,18,19]. The reason for this may come from the smaller size of the surgical wound, minimal dissection, and minimal muscle trauma, in the ET group.

A great benefit of ET is the excellent cosmesis when compared with conventional OT[19,20,22,27]. Over 90% of patients felt a high level of cosmetic satisfaction. We successfully hid the surgical scar in areas not usually seen in public, such as the axilla and the nipple area, which is particularly relevant for young women[26].

Despite the many advantages of ET, it requires

fine technical skills, long learning curve, and well-trained and enduring surgeons.

Conclusion

Endoscopic thyroidectomy (breast-axillary approach) is safe and superior to conventional open thyroidectomy in terms of postoperative pain, blood loss, hospital stay, and cosmesis. Operative complications were not significantly different between the two groups.

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