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Original Research Article

Endoscopic thyroidectomy-axilla breast approach: the experience of 26 cases

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ABSTRACT

Background: Conventional thyroidectomy results in transverse scar formation on neck. These scars are uncomfortable and cosmetically unacceptable. Endoscopic thyroidectomy is widely accepted technique in specialized centers. The potential advantages of endoscopic technique include better cosmetic result, decreased hospital stay and better patient comfort. Author started performing endoscopic thyroidectomy at the centre to demonstrate the feasibility of operating thyroid gland endoscopically by axilla breast approach.
Methods: Author performed 26 cases of endoscopic thyroidectomy by axilla breast approach from June 2014 to July 2017 in patients presenting with indication for surgical thyroid excision. Author did hemithyroidectomy in 19 patients, total thyroidectomy in 3 patients and near total thyroidectomy in 4 patients. All patients underwent endoscopic thyroidectomy by axilla breast approach by creating subplatysmal space with carbon dioxide insufflation at the pressure of 8 to 10mmHg. Results were compared with the recent studies with comparable number of patients.
Results: Author did hemithyroidectomy in 19 patients, total thyroidectomy in 3 patients and near total thyroidectomy in 4 patients. Mean Operative time was 88.19 min. But last 6 cases were completed in 49.60±4.20 min. Thus, as experience increased we tend to complete procedure in progressively lesser time period. Mean blood loss in the series was 21.88ml. Mean Hospital stay was 2.88 days (range 2-5 days). Scar satisfaction on visual analogue scale after 3 months of operation was 9.11. Histopathological examination revealed adenomatous goitre in 24 cases and follicular adenoma in 2 cases.
Conclusions: Endoscopic thyroidectomy via axilla breast approach is safe, feasible and minimally invasive surgical method for thyroid diseases, with good post-operative results. Surgeons having adequate training in endoscopic surgery can perform endoscopic thyroidectomy with short learning curve.

Keywords: Endoscopic thyroidectomy, Minimally invasive thyroid surgery

INTRODUCTION

Thyroid disorders are more common in women especially of younger age group. Conventional thyroidectomy results in transverse scar on neck. As young females are always concerned with their aesthetic appearance, these scars are uncomfortable and cosmetically unacceptable. This permanent blemish can lead to cervical hypoesthesia, paraesthesia's and increased self-awareness.[1] Endoscopic technique offers magnified view and better illumination that permits safe dissection. Endoscopic thyroidectomy, though a maximally invasive procedure, may provide superior cosmetic result as scars by this procedure get concealed within the patient axillary fossa and under the cloths. Takami et al was one of the first to describe this procedure and its advantages to that of open excision of thyroid gland.[2] Most of the large reported series, for endoscopic thyroidectomy, came from

specialized and large volume centers only. Therefore, its application to the wider surgical community remains questionable.[3] So author started performing endoscopic thyroidectomy at the centre as author had wide experience of advanced laparoscopic procedures. Thus, author demonstrated the feasibility of operating thyroid procedure endoscopically at peripheral tertiary care centre with reasonable skill in advanced laparoscopic procedures.

METHODS

This study was conducted in tertiary care hospital in central India with vast experience in advanced laparoscopic surgeries. Author performed 26 cases of endoscopic thyroidectomy by axilla breast approach from June 2014 to July 2017 in patients presenting with indication for surgical thyroid gland excision.

Patients presenting with thyroid swelling in outward patient department were assessed for feasibility by endoscopic thyroidectomy. Author included patients with thyroid nodule size up to 5cm. Patients were euthyroid and were fit for general anesthesia. Author excluded malignant thyroid lesions, diagnosed on fine needle aspiration cytology. Author also excluded patients with cervical spondylosis and previously operated for any kind of neck surgery.[4] Preoperatively, mobility of both vocal cords was ascertained by indirect laryngoscopy. Thyroid function test and fine needle aspiration cytology was being done in all patients. Such selected patients underwent endoscopic thyroidectomy by axilla breast approach.

Operative technique

Author performed endoscopic thyroidectomy under general anesthesia with endotracheal intubation by flexometalic tube. Patients were operated in supine position with sandbag placed under shoulder providing moderate extension to neck. The arm, opposite to the side of lesion (larger lesion in case of subtotal and total thyroidectomy), was extended. Single 10mm and two 5mm trocars were used. The instruments used for surgery were small graspers and Meryland dissector. Bipolar dithermy and ultrasonic scalpel were used as energy sources.

Author initiated surgery by introducing 10mm optical trocar at anterior axilliary fold in midway of lateral border of Pectoralis major, creating space above it. Left and right 5mm working ports were inserted. Position of right hand working port was 12 0'clock circumareolar and that of left hand working port was at anterior axillary fold in deltopectoral groove (Figure 1). Sub-platismally working space was created and insufflated with CO_2 at the pressure of 8 to 10mmHg. Harmonic scalpel was used to dissect avascular plane between the platysma and pectoralis major muscle. The sternocleidomastoid muscle identified, and plane between sternocleidomastoid and sternohyoid muscle was created. After elevating sternohyoid muscle, sternothyroid muscle was identified and retracted anteriorly exposing the ipsilateral thyroid gland. Inferior pedicle was dissected, identifying the recurrent laryngeal nerve and inferior parathyroid gland (Figure 2). The vessels were divided using harmonic scalpel, exposing the ligament of Berry. This maneuver allowed mobilization of gland, freeing the posterior surface from trachea allowing exposure of recurrent laryngeal nerve (Figure 3). Dissection is continued to reach and transect the superior thyroid pedicle. Using the harmonic scalpel, isthmus was transacted, mobilized and freed. After hemostasis was achieved gland was kept in endobag, made up of glove and the specimen was retrieved from 10mm port. Author used 5mm scope from one of the working port for this maneuver.

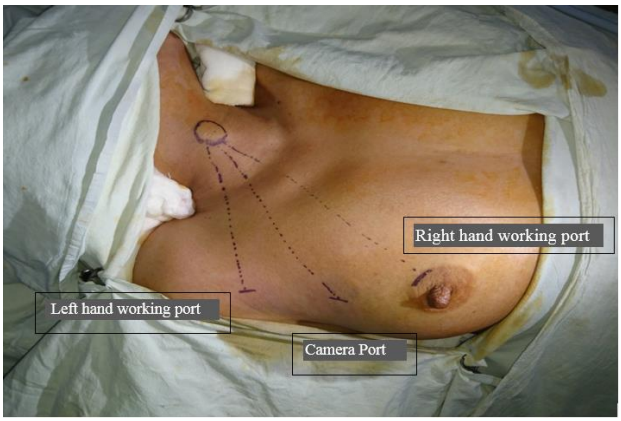

Figure 1: Port positions for endoscopic thyroidectomy.

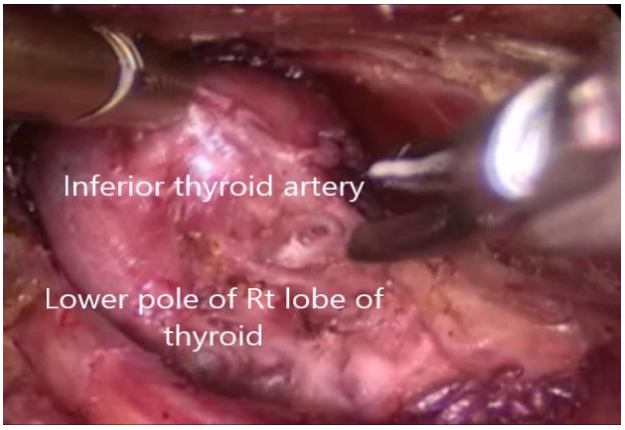

Figure 2: Dissection of inferior thyroid pedicle.

For the patient requiring total or near total thyroidectomy dissection was carried to contra-lateral side by retraction of the isthmus and identifying the contra-lateral lower pole. Then contra-lateral recurrent laryngeal nerve was identified. Using harmonic scalpel contra-lateral lobe including superior pedicle was taken leaving approximately 1-2gm of thyroid tissue. At the end of procedure, hemostasis was checked. Confirming the intactness of recurrent laryngeal nerve, wound was closed

in subcuticular fashion. In Initial 10 cases, author kept negative suction drains but later became selective in placing drain, only if diffuse oozing was present. Patient were discharged from hospital after removal of drain.

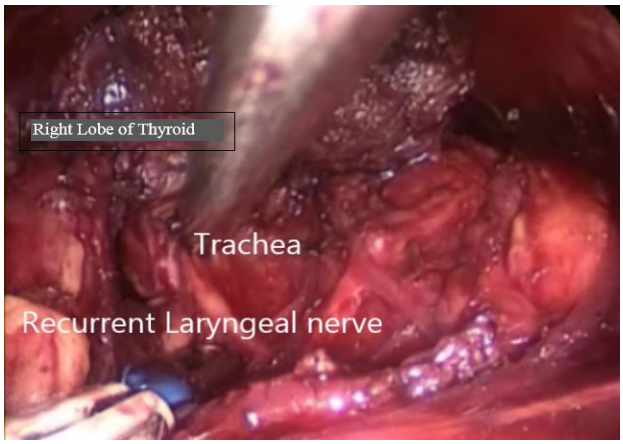

Figure 3: Demonstration of recurrent laryngeal nerve.

RESULTS

In this study 26 patients undergone endoscopic thyroidectomy by axilla breast approach**.** Female patients outnumbered present study with total of 21 as against 5 males. Mean age of the patients was 46.26±1.47 with a range of 59-28 years. Out of 26 patients of thyroid swelling, 24 had Adenomatous goiter and 2 had follicular neoplasm on preoperative assessment. Author did hemithyroidectomy in 19 (73%) patients, total thyroidectomy in 3 (11.53%) patients and near total thyroidectomy in 4 (15.38%) patients.

Table 1: Observations (n=26).

	Mean±SEM	Range
Age (years)	46.26±1.47	59-28
Size of gland removed (cm)	4±0.17	2.5-6
Time required for procedure (min)	88.19±4.75	120-38
Blood loss (ml)	21.88±1.43	40-12
Hospital stay (days)	2.88±0.16	5-2
Scar satisfaction after 3 months (visual analogue scale)	9.11±0.11	10-8

Author could complete all thyroidectomy endoscopically by axilla breast approach. The observations are as shown in Table 1. Mean operative time was 88.19±4.75 min. Mean blood loss in the series was 21.88ml. Mean hospital stay was 2.88 days (range 2-5 days) (Table 1). Initially 2 (7.69%) patients had hoarseness of voice but recovered after 15 days postoperatively. 3 (11.53%) patients had erythema around neck in post-operative period that resolved in 5-7 days. No patient had hypocalcaemia or recurrent laryngeal nerve injury. Scar satisfaction on visual analogue scale after 3 months of operation was 9.11. There was no conversion to open procedure. There was no emphysema or pneumomediastinum. Histopathological examination revealed adenomatous goiter in 24 cases and follicular adenoma in 2 cases.

author observed that for first 10 cases, required 109.30±2.40 min (Table 2). Next 10 cases took 92.40±1.15 min. Last 6 cases were completed in 49.60±4.20 min. Thus, as experience increased, author tend to complete procedure in progressively lesser time period (Table 2).

Table 2: Duration of Procedure as per learning curve.

No. of cases	Time required (Mean±SEM)
1 to 10	109.30±2.40 min
11 to 20	92.40±1.15 min
21 to 26	49.60±4.20 min

DISCUSSION

The revolution in the surgical management of thyroid disorder came after Gagner et al who described an endoscopic subtotal parathyroidectomy for patient with hyperparathyroidism in 1996.[5] Followed by this Huscher et al, first described complete right thyroid lobectomy in 1997.[6] Since then several other minimal access procedure including anterior chest wall and breast approach, as well as minimally invasive video assisted thyroidectomy (MIVAT), has been described as reasonable alternative to the open approach.[7] Endoscopic thyroid surgery has reduced the level of surgical invasiveness and results in an improved cosmetic appearance. The site of approach is important denominator in determining the acceptance for aesthesia. Various minimal invasive approaches are described in literature. They could be generally classified into direct/cervical and indirect/extra cervical approaches depending upon the location of incision. Direct cervical approach is the endoscopic replica of open thyroidectomy procedure except that it is completed by endoscopic instrument.[3] This was first described by a group of surgeons from Pisa, Italy in 1998.[7] But since incision is on neck it is cosmetically unacceptable and cannot be used for lesions more than 4cm. Only patients who have small nodules, with low index of suspected malignancy are offered this approach. The operative field is small, and camera is near the target organ making manipulation difficult for surgeon.

In 1998, Shimizu et al reported their experience of approaching the thyroid gland via infra clavicular incision, with the aim to have "scar less neck" after operation.[8] The anterior chest wall approach utilizes port access at various positions on the anterior chest wall depending on the surgeon, to avoid neck incision. Ohgami et al modified the incision and placed it on upper circumareolar areas in 2000.[9] The presence of an anterior chest wall incision was associated with hypertrophic changes or keloid especially in Asian population. Surgeons from Korea, proposed lowering the incision and placing them at the peri-areolar site to decrease the

"visibility" of scar, namely the unilateral axillo-breast approach.[10] In this series, author utilized this approach.

With this technique author have been able to perform hemithyroidectomy, total thyroidectomy as well as near total thyroidectomy. Although author had selection criteria of 5cm nodule size, author relaxed this few times considering benign lesions. Average size of nodule in the series was 4cm but maximum size removed in the series was 6cm. Author delivered the specimen by dilating 10mm port and introducing 5mm scope through one of 5mm port. Mean blood loss in the series was 21.88ml. It is comparable to open technique and comparable to other series (Table 3).[11-13] Mean operative time was 88.19 min. Author calculated the time required for surgery for first 10 cases, next 10 cases and last 6 cases, which decreased sequentially. With increase in experience, author could complete the procedure in shorter duration of time (Figure 4).

Table 3: Comparison of series of endoscopic thyroidectomy.[11-13]

Series (approach)	Ikeda (anterior chest wall)	Ikeda (axillary)	Ikeda (open)	Kitano (skin-lift)	Palazzo (lateral)	Puntambekar (anterior chest wall	The series (axilla breast)
No. of patients	15	15	15	22	38	15	26
Average nodule size (mm)	40	42	41	25	22	48	40
Operative time (min)	145	175	84	279	99	85	88.19
Average blood loss (ml)	25	30	36	95	Na	20	21.88
Average hospital stays (days)	4.5	4.2	4.8	4	2	2	2.88

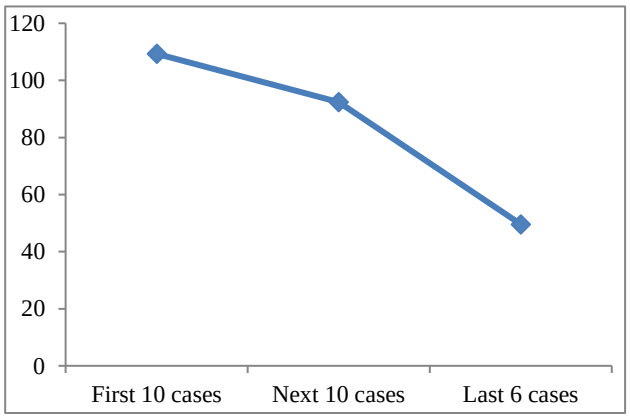

Figure 4: Time required for completing cases sequentially.

Author discharged the patients after 2-5 days. Mean stay was 2.88 days. Thus, minimal invasive technique was beneficial in managing ting wounds, instead of long cervical wounds. Author calculated scar satisfaction by Visual Analogue Scale and all the patients were satisfied with their scars depicted by 9.11 score at the end of 3 months. Endoscopic axilla-breast approach provide scar under cloths avoiding scarring on chest wall and completely hiding the incisions under cloths. Size of the gland, which is the limiting factor in axilla breast approach, can be overcome by CO_2 insufflation and triangularization and making working ports coaxial with camera port. Being familiar with laparoscopic surgery and having experience of operating open thyroid procedures, Author attempted the procedure safely without any complication.

CONCLUSION

Endoscopic thyroidectomy via axilla breast approach is safe, feasible and minimally invasive surgical method for thyroid surgery. Inspite of reduced skin incision, precise anatomical details are seen through a greatly magnified view using an endoscopic camera. This approach provides good operative results and has low complication rate. For selected thyroid patients who are concern about neck scar this approach is an effective surgical approach. Surgeons having adequate training in advanced laparoscopic surgery can perform endoscopic thyroidectomy with short learning curve.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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