

Gasless Transaxillary Thyroidectomy: A Technique of Endoscopic Thyroidectomy

PRK Bhargav

ABSTRACT

Various endoscopic thyroidectomy (ET) techniques ranging from video-assisted, total endoscopic, transaxillary endoscopic, robotic and chest wall approaches have been reported for thyroid surgery. They can be broadly divided into gas-dependent and gasless approaches. Here, we describe our technique of gasless transaxillary thyroidectomy with synergistic benefits of open and endoscopic thyroidectomies.

Keywords: Endoscopic thyroidectomy, Transaxillary route, Hypercarbia, Technique.

How to cite this article: Bhargav PRK. Gasless Transaxillary Thyroidectomy: A Technique of Endoscopic Thyroidectomy. *World J Endoc Surg* 2013;5(2):61-63.

Source of support: Nil

Conflict of interest: None

INTRODUCTION

Present times mark an era of minimal invasive techniques. In the same vein, various endoscopic thyroidectomy (ET) techniques ranging from video-assisted, total endoscopic, trans-axillary endoscopic, robotic, chest wall approaches have been reported for thyroid surgery.¹⁻⁴ The main objectives of any ET technique are better cosmesis and feasibility. Both gas-dependent (CO₂) and gasless techniques have been attempted. The former techniques are prone to complications, such as subcutaneous emphysema and hypercarbia.⁵ In this context, we described our technique of gasless ET through transaxillary route addressing the main objectives of ET.

SURGICAL TECHNIQUE

The surgical equipment constitutes standard laparoscopic set and instruments for open thyroid surgery. Preoperative preparation of the patient is similar to any other general surgical procedure. Comorbid conditions, such as diabetes, hypertension and respiratory diseases were optimized before surgery with appropriate medication, diet and exercise. In all patients, the procedure is performed under general inhalational anesthesia with single lumen endotracheal intubation. Patient was placed supine in 200 reverse Trendelenburg position with neck extension. Ipsilateral arm on the side of goiter being operated is abducted to 90° and elbow is flexed such that hand stays besides the head

(Fig. 1). The arm is padded and strapped in this position. Surface markings of the clavicle, anterior axillary line (AAL), sternocleidomastoid (SCM) and midline are made (Fig. 1). For total thyroidectomy both sides are prepared similarly.

A 4 to 5 cm incision is made 1 cm posterior and parallel to AAL. Incision is deepened up to the pectoralis fascia and it is incised in the same line. Then the plane of dissection is confined to underneath the pectoralis fascia. The operative space is created by combination of blunt digital and sharp dissection with a long hemostat. The subpectoral dissection is continued up to the clavicle. Beyond clavicle, the dissection is continued in subplatysmal plane of the neck until ipsilateral SCM muscle is reached. The supero-medial skin flap thus created is retracted by the assistant surgeon (AS) to widen the operative for further dissection. In few cases, a balloon inflated with saline is used to create larger operative space. At this stage, 30° 10 mm telescope is inserted through the same incision and handled by the camera assistant (CA). The subplatysmal plane is further developed superiorly up to the hyoid bone and medially up to 1 cm beyond the midline on contralateral side. Thus, dissection is performed under direct vision with naked eye and magnified image on monitor synergistically. The position of the operating surgeon (OS) is sitting on a high table on goiter side, visualizing the operative field and goiter through the axillary incision (Fig. 2). CA stands by the side of the OS to visualize and capture the procedure on monitor (Fig. 2). Intermittently, OS and assistant obtains a magnified and illuminated view of specific areas on the monitor. OS utilizes long hemostats for dissection and reaches the goiter and thyroid bed between the two heads of SCM, which is a relatively avascular area (Fig. 3). The sternal head and strap muscles are retracted by AS to the opposite side throughout the procedure (Fig. 2). OS retracts the clavicular head posterior—laterally using long tissue holding forceps or fingers.

Both open and laparoscopic hand instruments are used complementarily as required. Once the visceral space of thyroid is reached, the pretracheal fascia is incised and carotid sheath is retracted laterally. Middle thyroid vein is searched for and if present, it is suture ligated and divided. Then dissection is continued close to the thyroid gland

superiorly to ligate superior vascular pedicle with conventional knotting (Fig. 3). The superior parathyroid gland (PT) is identified and conserved. Goiter is kocherized and lifted up to visualize recurrent laryngeal nerve (RLN). RLN is identified and protected. With distal dissection, inferior thyroid veins are isolated and clipped individually using endoclips. Smaller vessels are secured with either open or endoscopic bipolar diathermy forceps as per the need. In doing so, care is taken to avoid injuring the RLN which is usually located between the trachea and carotid artery. Endoscopic diathermy probes were especially useful for distant and deeper blood vessels. Endoscopic magnification is extremely advantageous during this step as well as while securing RLN and PT. The gland is dissected out from the trachea-esophageal groove after securing the RLN and inferior PTG. The lobe is retracted anteromedially and ligament of Berry is divided with bipolar diathermy. The

isthmus is separated from the trachea. In hemithyroidectomy, ipsilateral goiter is resected after incising the isthmus. The cut end of the isthmus is sutured in a conventional way using long needle holder and forceps. For total thyroidectomy, similar procedure is repeated on the contralateral side through a similar incision in opposite axilla. The dissected opposite lobe can be caught with babcock's forceps and retracted through contralateral axillary incision for better exposure of the other lobe being dissected later in total thyroidectomy. The resected specimen is retrieved through the axillary incision. Proper hemostasis is achieved. Negative suction tube drain is kept through separate incision. Axillary incision is closed.

Postoperative care is same as conventional thyroidectomy. Drain is removed within 72 to 96 hours. Intraoperative and postoperative period was uneventful in all the cases. Patients are discharged after drain removal.

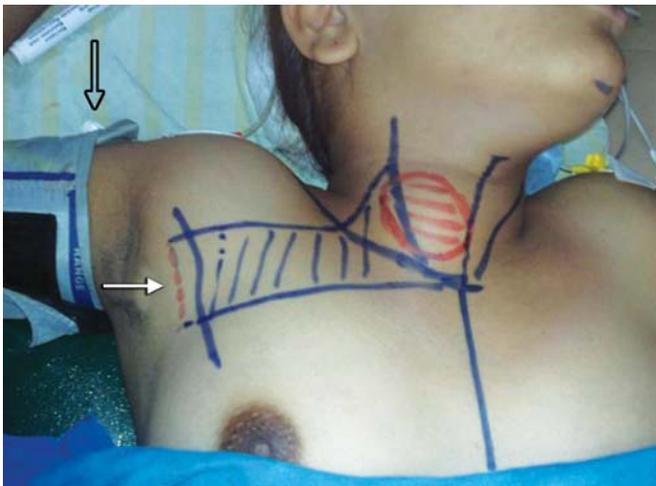


Fig. 1: Patient's operative position with surface markings of surgical landmarks—axillary incision (white arrow) and 90° abducted arm

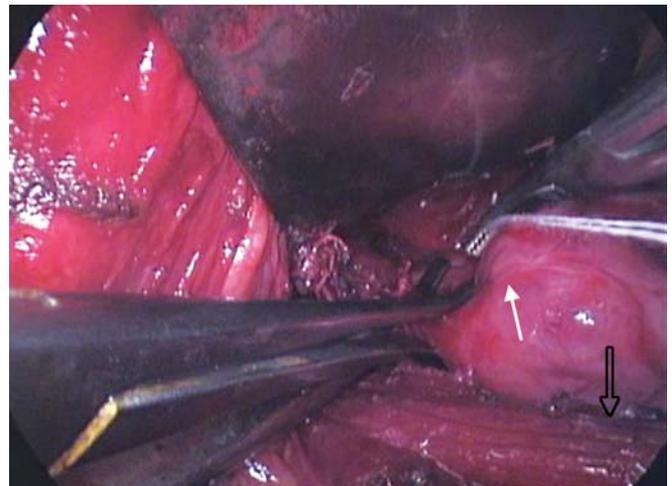


Fig. 3: Intraoperative image—thread feeding for superior pole ligation (white arrow) and retracted lateral head of sternocleidomastoid muscle (hollow arrow)



Fig. 2: Position of surgical team—operating surgeon (white arrow); camera assistant (hollow arrow); assistant surgeon (black arrow) and monitor is on right side of image



Fig. 4: Postoperative photograph of neck showing scarless neck and hidden axillary scar (hollow arrow)

SUMMARY

Thyroid surgery has been performed since ancient times and has followed many steps of evolution to reach the time of endoscopic surgery. Conventional open thyroidectomies are effective, safe, well-tolerated and time tested, but leaves an evident scar in the exposed part of body, which can occasionally be cosmetically unacceptable. Minimally invasive surgery of the neck was first developed for management of thyroid and parathyroid disorders.^{6,7} ET is in the phase of evolution. There are various approaches for it ranging from video-assisted, total endoscopic, trans-axillary and chest wall approaches.¹⁻⁴ Gas dependent (CO₂) ET techniques can be associated with morbidity of subcutaneous emphysema, hypercarbia, pneumomediastinum, cardiac arrhythmias.^{5,8} In an effort to lessen the adverse esthetic effects of conventional open surgical technique and gas-dependent ET techniques, gasless ET techniques have evolved. The procedure described here is one such technique through transaxillary route.

In present technique, incision taken in the axilla remains totally hidden beneath the clothes. Due to a natural plane, creation of the subpectoral space and its continuation in the subplatysmal plane in the neck is easy. Thyroid bed is reached through two heads of SCM without the need to divide or split the strap muscles. Throughout the procedure the sternal head of SCM along with strap muscles are retracted anteromedially by the assistant. As the space is created after dissection, it does not require gas (CO₂) thus preventing gas-related morbidity. Synergistic use of naked eye and magnified monitor vision ensures accurate identification and preservation of vital structures like RLN and PTG.

In this technique, the apparent disadvantage is increased area of dissection in the infraclavicular region. As the OS visualizes the operative field horizontally through the

axillary incision, it becomes difficult to reach opposite thyroid lobe. Thus, excision of opposite lobe needs another incision in the contralateral axilla. To hold the telescope without a fulcrum is another task for CA. In spite of these shortcomings, the end result is gratifying for the patient and surgeon with a virtually scarless thyroidectomy (Fig. 4).

REFERENCES

1. Miccoli P, Berti P, Raffaelli M, Conte M, Materazzi G, Galleri D. Minimally invasive video-assisted thyroidectomy. *Am J Surg* 2001;181:567-70.
2. Kang SW, Jeong JJ, Yun JS, Sung TY, Lee SC, Lee YS, et al. Gasless endoscopic thyroidectomy using trans-axillary approach; surgical outcome of 581 patients. *Endocr J* 2009;56(3): 361-69.
3. Holsinger FC, Terris DJ, Kuppersmith RB. Robotic thyroidectomy: Operative technique using a transaxillary endoscopic approach without CO₂ insufflation. *Otolaryngol Clin North Am* 2010;43(2):381-88.
4. Puntambekar SP, Palep RJ, Patil AM, Rayate NV, et al. Endoscopic thyroidectomy: Our technique. *J Min Access Surg* 2007;3(3):91-97.
5. Bhargav PRK, Kusumanjali A, Nagaraju R, Amar V. What is the ideal CO₂ insufflation pressure for endoscopic thyroidectomy? Personal experience with five cases of goiter. *World J Endocrine Surg* 2011;3(1):3-6.
6. Huscher CS, Chiodini S, Napolitano C, Recher A. Endoscopic right thyroid lobectomy. *Surg Endosc* 1997;11:877.
7. Gagner M. Endoscopic subtotal parathyroidectomy in patients with primary hyperparathyroidism. *Br J Surg* 1996;83:875.
8. Lee WK, Choi YS, Chae YK, Kim YH, et al. Massive subcutaneous emphysema and hypercarbia during endoscopic thyroidectomy: A case report. *Korean J Anesthesiol* 2004;47(6): 898-901.

ABOUT THE AUTHOR

PRK Bhargav

Associate Professor, Department of Endocrine and Metabolic Surgery Mamata Medical College and Superspeciality Hospital, Khammam Andhra Pradesh, India, e-mail: kingbhargav@gmail.com