

# Transoral Endoscopic Thyroid Surgery through Vestibular Approach

<sup>1</sup>Gyan Chand, <sup>2</sup>SK Mishra

## ABSTRACT

Scarless neck surgery for thyroid became popular after the advancement of endoscopic and robotic thyroid surgery. Different approaches have been practiced for endoscopic thyroid surgery in different parts of the world.

**Keywords:** Endoscopic thyroid surgery, Endoscopic thyroid surgical techniques, Transoral thyroid surgery.

**How to cite this article:** Chand G, Mishra SK. Transoral Endoscopic Thyroid Surgery through Vestibular Approach. *World J Endoc Surg* 2016;8(2):179-182.

**Source of support:** Nil

**Conflict of interest:** None

## INTRODUCTION

Endoscopic thyroid surgery was started in early 1996 after Gagner<sup>1</sup> who first performed endoscopic parathyroidectomy, followed by Huscher et al<sup>2</sup> who performed the first endoscopic thyroid surgery in 1997. Endoscopic surgery in the neck has become popular, and within 10 years various approaches for thyroid surgery have been practiced in different parts of the world. Asian surgeons practiced total scarless neck thyroid surgery through different approaches.<sup>3-16</sup> In scarless neck surgery for thyroid, one advanced approach is the natural orifice transluminal endoscopic surgery (NOTES) that has been practiced in transoral thyroid surgery.

Transoral thyroid surgery was first practiced in animal models and cadavers.<sup>17,18</sup> Recently, it is being practiced by different surgeons in humans with thyroid nodule.<sup>19-22</sup> It has excellent cosmetic outcome on select group of patients.

This article is based on description by the author's own experience of endoscopic thyroid surgery, as described in the literature.<sup>21,22</sup> This approach is most suitable for the small, benign, or low malignant potential thyroid nodule, less than 5 cm in largest diameter,<sup>23</sup>

involving one or both lobes of thyroid without cervical lymphadenopathy and without component of thyroiditis. The extraction of Bigger specimen through vestibular incision in this approach was difficult; it was performed by breaking into pieces inside the endobag.<sup>22</sup>

## SURGICAL TECHNIQUE

### Instruments

This technique requires conventional laparoscopic instruments, very similar to conventional advanced laparoscopic surgery that includes routine high-definition telescope with two medical-grade monitors, routine laparoscopic hand instruments, electrocautery with energy sealing device, e.g., LigaSure (Covidien, USA), Harmonic Ace (Ethicon, USA), or Thunderbeat (Olympus, Japan).

### Patient Selection

For this procedure, we selected patients with benign thyroid nodule, usually less than 3 cm in size. We excluded patients who had large tumor, malignancy, toxic goiters, and thyroiditis.

### Preoperative Preparations

All patients were adequately evaluated with routine investigations for surgery, including thyroid function test, ultrasound, or contrast computed tomography scan of neck. Ultrasound-guided fine-needle aspiration cytology of thyroid nodule was performed to make the diagnosis and to rule out malignancy. Adequate control of preoperative comorbid conditions like diabetes, hypertension, and respiratory disease were taken in all patients before surgery. We instructed all the patients to use mouthwash for minimum 1 week before surgery after every major meal and before sleep.

### Anesthesia

All patients were operated under general anesthesia with single-lumen flexometallic endotracheal tubes through nasal intubation.

### Position

After general anesthesia through nasal intubation, the patient was put on a supine position at 30° reverse

<sup>1</sup>Additional Professor, <sup>2</sup>Professor

<sup>1,2</sup>Department of Endocrine Surgery, Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow, Uttar Pradesh, India

**Corresponding Author:** Gyan Chand, Additional Professor Department of Endocrine Surgery, Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow, Uttar Pradesh, India Phone: +919451546353, e-mail: gyan133@sgpgi.ac.in

Trendelenburg position with adequate pillow under the shoulder to give full extension over the neck, and the head was supported by head ring. Both arms were adducted at the shoulder joint and kept by the side of the body.

The neck and chest were well cleaned with povidone scrub lotion and painted with povidone iodine lotion. The oral cavity was packed with povidone iodine gargle-soaked gauze pack and the vestibule was cleaned twice with povidone iodine mouthwash lotion.

### Skin Markings

After proper draping of the operating field with sterile drapes, the surface marking of both the clavicles, sternocleidomastoid muscles (SCM), thyroid cartilage, midline of neck and suprasternal notch was marked with skin marking pen.

After skin marking, 1:500 adrenal saline solution was injected in the subplatysmal plane vertically in the neck and horizontally in the lateral border of one SCM to another SCM. This adrenaline saline is also infiltrated in the vestibular side of lip and the under the skin in the chin (Fig. 1).

### Incision and Port Placement

Three incisions were made over the vestibular side of lip: One central 12-mm transverse incision in the midline along both sides of the frenulum. Other two 5-mm incisions were placed vertically at the level of both canine teeth.

Subplatysmal space was created into the neck by using long artery forceps vertically through 12-mm incision site into the lip. The 12-mm trocar was inserted through this central incision into the blind space of neck; CO<sub>2</sub> gas was insufflated at 6 mm Hg pressure and at 7 L/min flow rate. The 10-mm 30° 3D rigid telescope (Viking) was inserted through this port; two 5-mm incisions were made vertically in the lip toward vestibular side at the level of incisor teeth and two 5-mm trocars were inserted under direct vision. The dissection proceeded under vision to create adequate subplatysmal space by using SonoSurg (Olympus). The subplatysmal space was created laterally up to the lateral border of both SCM and vertically from sternal notch up to the hyoid bone (Figs 2 to 4).



Fig. 1: Position and skin marking



Fig. 2: Vestibular central incision

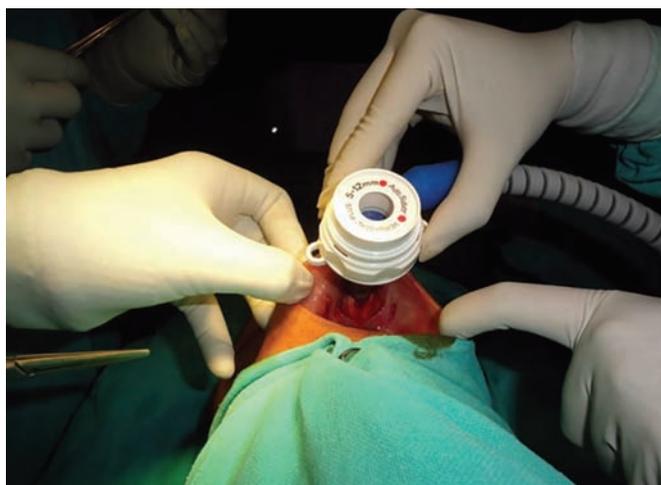


Fig. 3: First trocar placement



Fig. 4: All working port placement

## Dissection of Strap Muscles

After adequate space was created, the strap muscle was opened in the midline with SonoSurg; sternohyoid muscle was separated from the sternothyroid muscle on both the sides. Silk 2-0 suture was passed from skin to anchor the upper end of sternohyoid muscle and retract laterally from outside. The isthmus of thyroid was dissected from trachea inferiorly and bisected by using SonoSurg.

The operating lobe was dissected from the medial side to separate it from the trachea and then the isthmus was held with grasper forceps and retracted toward the opposite side. The sternothyroid muscle was then separated from the superior surface of the thyroid lobe; we had cut few medial fibers of the sternothyroid muscle to reach up to the superior pole of thyroid lobe. The superior pole is coagulated and cut by SonoSurg. Further, it was proceeded laterally and the middle thyroid vein, if present, was coagulated and cut. After lifting the superior pole of thyroid, the inferior thyroid artery and recurrent laryngeal nerve became visible. The inferior thyroid artery was coagulated and cut with SonoSurg and the recurrent laryngeal nerve was preserved. Further dissection proceeded to continue from the tracheal side and lateral thyroid border to reach the lower pole of thyroid, finally the inferior thyroid vessels were coagulated after identifying the inferior parathyroid. The specimen was put into the endobag and taken out through central 12-mm incision with difficulty. If the specimen was large, it was bisected into the endobag. Hemostasis was secured and strap muscle was approximated in midline by using vicryl 3-0 suture. Endoscopic trocars were taken out and the vestibular incisions were closed in two layers with 3-0 and 4-0 vicryl without any drain. The incision site was covered with gauge-soaked povidone iodine mouthwash lotion; the pressure dressing was applied over the chin and mandible (Fig. 5).



**Fig. 5:** Oral stitches placement

## Postoperative Care

After the surgery, the patient was shifted to the recovery room with oxygen supply, and liquid diet was resumed from next day with adequate oral hygiene. Adequate antibiotics and analgesics were given and the patient discharged on 2nd postoperative day.

## Postoperative Complications

This surgery is performed through high-bacterial-burden oral cavity, therefore use of preoperative and postoperative disinfectants and prophylactic antibiotics has a great role in preventing infection. The course of antibiotic is recommended for coverage of Gram-negative aerobes and anaerobes. If infection and pus collection develop, adequate medical treatment with drainage of pus is required. Hemithyroidectomy with this approach usually does not require drainage, but in the case of total thyroidectomy, drainage of the cavity is required. Sometimes, hematoma may form even after hemithyroidectomy, and then medical management and surgical intervention may be required. Recurrent nerve injury and hypoparathyroidism are possible as in other approaches of thyroid surgery. There are chances of mental nerve injuries, which can be prevented by choosing the appropriate site for lateral 5-mm trocars and not inserting near to level of premolars.

## DISCUSSION

The esthetic demand by the patients to undergo surgery is rapidly increasing, and that pushes surgeons to think beyond the boundaries of conventional surgery. The NOTES was invented for totally scar-free approach. It was successfully practiced for abdominal surgery, but for thyroid surgery it is still in the primitive stage.

Transoral thyroid surgery is not much popular, and few case reports and few small case series have been published in the literature from the Asian region. Wilhelm and Metzger<sup>19</sup> performed the first thyroid NOTES, endoscopic minimally invasive thyroidectomy, in eight patients using a sublingual approach by piercing through the floor of mouth and with two oral vestibular working ports. Transoral video-assisted neck surgery was reported by Nakajo et al,<sup>20</sup> who used 2.5-cm single incision at oral vestibule and a gasless technique by lifting the anterior neck skin with Kirschner wires. Recently in 2015, Anuwong<sup>22</sup> has published a series of 60 human cases through transoral vestibular approach by using conventional laparoscopic instruments and ultrasonic device. He concluded that this approach is safe and feasible.

Most surgeons practice transoral thyroidectomy for small thyroid lesions less than 6 cm and for benign

conditions only. Majority of patients are females and many surgeons who are practicing transoral thyroidectomy follow almost similar surgical steps.<sup>19-22</sup>

The Indian Males have prominent chin and prominent Adam's apple, so we faced difficulties during port placement and specimen removal in vestibular approach. Therefore we had selected small size, benign thyroid nodule in thin built males with long size neck for this approach.

Patients were satisfied after the surgery; soft and liquid diet was advised on 1st postoperative day and patients were discharged on 2nd postoperative day.

## CONCLUSION

Transoral thyroid surgery through vestibular approach is a feasible and safe technique in the selected group of patients with small benign, euthyroid thyroid nodule.

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