

## Observational Study

### Aesthetic thyroid surgery

Vivek Aggarwal<sup>1</sup>, Deepak Khandelwal<sup>2</sup>, Deep Dutta<sup>3</sup>, Monika Garg<sup>4</sup>

Cosmesis after thyroid surgery has always been a concern for patients approaching for thyroid surgery by conventional cervical approach. To avoid a scar in the neck, various non cervical approaches for thyroidectomy have been described in literature. These approaches include endoscopic techniques like minimally-invasive video-assisted thyroidectomy (MIVAT), endoscopic anterior chest/breast approach, transaxillary approach, axillary-breast approach, and other novel experimental approaches like posterior auricular approach, and transoral approach. Some of these approaches can also be done with the assistance of the robot (ie, robotic-assisted thyroidectomy). Each technique or approach has its own benefits and weaknesses and the choice seems to be determined by the surgeon's own experience and the patient's preference. Selection of patient is of paramount importance and currently such surgical procedures should be performed only by experienced surgeons in high volume centers for good surgical outcome.

[J Indian Med Assoc 2018; 116: 25-6 & 30]

**Key words :** Aesthetic thyroid surgery, endoscopic thyroidectomy, minimal invasive thyroidectomy, thyroid nodule, transoral thyroidectomy.

There is an ongoing evolution in the surgical techniques of thyroidectomy, ever since thyroid surgery has been described. The development not only aims at increasing safety but also improving cosmesis as a demand over period of time. To increase safety, newer techniques have been adopted like intraoperative neuromonitoring of recurrent laryngeal nerve (RLN), postoperative parathyroid hormone assay and alternative energy devices such as ultrasonic shears or bipolar coagulation. For improving cosmesis newer surgical techniques are being validated. These techniques have been developed using endoscopic instruments and the high-density telescope which have allowed surgeons to make a smaller incision and take the line of incision away from visible site in the neck.

Any procedure, which involves using the endoscope for thyroid surgery, is often collectively called "endoscopic thyroidectomy"<sup>1</sup>. Since the first report of endoscopic parathyroidectomy by Gagner et al. in 1996,<sup>2</sup> various minimal invasive approaches have been described for neck surgeries in the literature. Endoscopic thyroid surgery was first successfully performed by Huscher<sup>3</sup>. Most series will suggest use of such techniques for selected cases in terms of nodule size and pathology<sup>4-6</sup>. Many variation of endoscopic thyroidectomy has been described in terms of port

- A variety of aesthetic surgical approaches for thyroid surgery are now practiced for cosmesis in young female.
- Minimally-invasive video-assisted thyroidectomy (MIVAT), endoscopic anterior chest/breast approach, posterior auricular approach, and transoral approach, robotic-assisted thyroidectomy are some of such techniques.
- Each technique has some merits and demerits hence choice of approach is determined by the surgeon's own experience and the patient's preference only.

placement in literature. They could be generally classified into direct/cervical and indirect/extra-cervical approaches depending on the location of the incision. For the direct/cervical approach, small incision(s) are made in the neck area and the thyroid gland is exposed directly similar to the conventional thyroidectomy but with endoscopic instruments also called minimally invasive video assisted thyroidectomy (MIVAT) It is the indirect methods, which give maximal cosmetic benefit but may not be truly minimally invasive as the dissection involved in raising the flap may be more than conventional<sup>7</sup>.

Another endoscopic approach suggested by some surgeons is transoral natural orifice thyroidectomy which is devoid of any visible scar in external surface<sup>8,9</sup>. All these endoscopic procedures can have a robotic arm in place of conventional endoscopic instruments with surgeon operating from a distant site called robotic thyroidectomy.

#### *Extra Cervical Endoscopic Thyroidectomy (Axillary-breast Approach) :*

Surgery is done under general anesthesia with patient in same position as open thyroidectomy except the contra

<sup>1</sup>Department of Endocrine Surgery, Maharaja Agrasen Hospital, Punjabi Bagh, Delhi 110026

<sup>2</sup>Department of Endocrinology, Maharaja Agrasen Hospital, Punjabi Bagh, Delhi 110026

<sup>3</sup>Department of Endocrinology, Venkateshwar Hospitals, Dwarka, New Delhi 110075

<sup>4</sup>Department of Radiology, Maharaja Agrasen Hospital, Punjabi Bagh, Delhi 110026

lateral arm is placed in slightly extension. The lesion side arm is then raised over the patient's head to expose the axilla, and the contra lateral arm is mildly abducted, in case conversion to total thyroidectomy using bilateral axillary breast approach is required. Axillary breast approach can have many variations like axillary only, breast only, anterior chest and any combination of these depending on surgeons comfort, ergonomics and instruments<sup>10</sup>.

In our study<sup>11</sup> of the combined breast axillary approach using endoscopic technique for unilateral thyroid nodule in 12 young female patients (mean age 27.2 years), the results were promising. The mean operating time was 187 minutes, which in our experience is prolonged as compared to conventional thyroidectomy. None of the patients required conversion to open surgery. There was temporary recurrent laryngeal nerve injury in one case, local wound infection in two cases, prolonged subcutaneous emphysema in five cases and prolonged analgesic requirement (>5 days) in 10 cases. None of the cases suffered from permanent recurrent laryngeal nerve injury or trachea-esophageal injury. The surgical procedure had acceptable morbidity and can be offered to selected patients for cosmetic advantage.

### *Cervical Endoscopic Thyroidectomy (MIVAT) :*

The MIVAT was first described by Micolli from Italy, in 1998<sup>7</sup>. This technique is associated with excellent cosmetic and surgical outcomes<sup>12-13</sup>. However, only 10-15 % of patients with a small goiter would be suitable. Only patients with a solitary thyroid nodule <35 mm and/or thyroid volume <25 ml are considered suitable for MIVAT. Besides size, redone surgery, previous neck irradiation and locally invasive carcinoma are also considered absolute contraindications<sup>14,15</sup>.

### *Novel endoscopic procedures :*

**(1) Posterior auricular approach** — This technique uses a potentially hidden space behind the ears and occipital hair line and is also a gasless technique. The patient lies in a supine position with the head slightly rotated away from the side of pathology. The incision is then made along the post-auricular crease extending into the occipital hairline. An important limitation of this procedure is that only one side can be approached by an ipsilateral incision<sup>16</sup>.

**(2) Trans-oral thyroidectomy** — It is feasible to excise the thyroid gland through an incision in the floor of the mouth under gas insufflation. Cases of trans-oral parathyroidectomy have also been reported<sup>17</sup>. This approach seems to be technically feasible but is heavily criticized for its safety. The working space is very limited and potential infection through a relatively contaminated incision

is a major concern<sup>18,19</sup>. We recently reported the first case of trans-oral thyroidectomy using two ports only as compared to 3 ports used in other series<sup>20</sup>.

**(3) Robotic thyroidectomy** — Since the first report of robotic trans-axillary thyroidectomy in 2009, robotic thyroidectomy has been widely performed worldwide<sup>21-24</sup>. Theoretically, it overcomes many of the technical challenges associated with transaxillary thyroidectomy because the robot can provide a three dimensional magnified view, seven degree of freedom and 90° articulation and can filter any hand tremors<sup>22</sup>. In a multi-center study with 2,014 patients, Lee *et al*<sup>25</sup> showed that robotic thyroidectomy had a minimal complication rate of about 1 % and superior surgical ergonomic benefits for surgeons.

### *Selection of Approach and Patient Satisfaction :*

Different minimally invasive approaches have been described in the literature. Currently, there is no evidence to suggest that one particular approach is better than others. It appears it is highly variable and dependent on the surgeon's own experience and the patient's preference. One study compared the short-term surgical outcomes, scar appearance and patient satisfaction between MIVAT and the transaxillary approach and found that the transaxillary approach was a technically more challenging procedure and was associated with a longer hospital stay, longer operating time, more immediate pain, and increased overall RLN injury and morbidity compared with MIVAT. The 6-month scar appearance and patient satisfaction were similar between the two surgical procedures<sup>26</sup>. By operating with a minimal invasive or endoscopic approach, reports suggest a higher patient satisfaction and cosmetic outcome can be achieved<sup>27</sup>.

### *Conclusions :*

Since the first report of endoscopic subtotal parathyroidectomy in 1996, a variety of aesthetic surgical approaches have been reported for thyroid surgery. Aim of these techniques is to avoid scar in the neck, which is often demanded especially by young females. Currently such thyroid surgical procedures have a role in a small group of patients who fit strict selection criteria. These approaches require high level of expertise, and therefore currently should be done by experienced surgeons only.

### REFERENCES

- Berber E, Bernet V, Fahey TJ, Kebebew E, Shaha A, Stack BC Jr, *et al* — American Thyroid Association Surgical Affairs Committee. American Thyroid Association Statement on Remote-Access Thyroid Surgery. *Thyroid* 2016; **26**: 331-7.
- Gagner M — Endoscopic subtotal parathyroidectomy in patients with primary hyperparathyroidism. *Br J Surg* 1996; **83**: 875.
- Hüscher CS, Chiodini S, Napolitano C, Recher A — Endo-

(Continued on page 30)

(Continued from page 26)

- scopic right thyroid lobectomy. *Surg Endosc* 1997; **11**: 877.
- 4 Rafferty M, Miller I, Timon C — Minimal incision for open thyroidectomy. *Otolaryngol Head Neck Surg* 2006; **135**: 295-8.
  - 5 Park YL, Han WK, Bae WG — 100 cases of endoscopic thyroidectomy: breast approach. *Surg Laparosc Endosc Percutan Tech* 2003; **13**: 20-5.
  - 6 Ohgami M, Ishii S, Arisawa Y, Ohmori T, Noga K, Furukawa T, *et al* — Scarless endoscopic thyroidectomy: breast approach for better cosmesis. *Surg Laparosc Endosc Percutan Tech* 2000; **10**: 1-4.
  - 7 Miccoli P, Berti P, Conte M, Bendinelli C, Marcocci C — Minimally invasive surgery for thyroid small nodules: preliminary report. *J Endocrinol Invest* 1999; **22**: 849-51.
  - 8 Anuwong A, Kim HY, Dionigi G — Transoral endoscopic thyroidectomy using vestibular approach: updates and evidences. *Gland Surg* 2017; **6**: 277-84.
  - 9 Witzel K, Hellinger A, Kaminski C, Benhidjeb T — Endoscopic thyroidectomy: the transoral approach. *Gland Surg* 2016; **5**: 336-41.
  - 10 Tan CT, Cheah WK, Delbridge L. “Scarless” (in the neck) endoscopic thyroidectomy (SET): an evidence-based review of published techniques. *World J Surg* 2008; **32**: 1349-57.
  - 11 Aggarwal V, Raja BK, Garg M, Khandelwal D, Agarwal B. Endoscopic Thyroidectomy— Preliminary Experience from a Tertiary Care Center in Delhi, India. *US Endocrinology* 2017; **13**: 27-9
  - 12 El-Labban GM — Minimally invasive video-assisted thyroidectomy versus conventional thyroidectomy: a single-blinded, randomized controlled clinical trial. *J Minim Access Surg* 2009; **5**: 97-102.
  - 13 Bellantone R, Lombardi CP, Bossola M, Boscherini M, De Crea C, Alesina PF, *et al* — Video-assisted vs conventional thyroid lobectomy: a randomized trial. *Arch Surg* 2002; **137**: 301-4; discussion 305.
  - 14 Miccoli P, Materazzi G, Berti P — Minimally invasive thyroidectomy in the treatment of well differentiated thyroid cancers: indications and limits. *Curr Opin Otolaryngol Head Neck Surg* 2010; **18**: 114-8.
  - 15 Zhang P, Zhang HW, Han XD, Di JZ, Zheng Q — Meta-analysis of comparison between minimally invasive video-assisted thyroidectomy and conventional thyroidectomy. *Eur Rev Med Pharmacol Sci* 2015; **19**: 1381-7.
  - 16 Lee DY, Baek SK, Jung KY — Endoscopic thyroidectomy: retroauricular approach. *Gland Surg* 2016; **5**: 327-35.
  - 17 Karakas E, Steinfeldt T, Gockel A, Schlosshauer T, Dietz C, Jäger J, *et al* — Transoral thyroid and parathyroid surgery--development of a new transoral technique. *Surgery* 2011; **150**: 108-15.
  - 18 Bakkar S, Al Hyari M, Naghawi M, Corsini C, Miccoli P — Transoral thyroidectomy: a viable surgical option with unprecedented complications-a case series. *J Endocrinol Invest* 2017 Dec 14.
  - 19 Miccoli P, Materazzi G, Berti P — Natural orifice surgery on the thyroid gland using totally transoral video-assisted thyroidectomy: report of the first experimental results for a new surgical method: are we going in the right direction? *Surg Endosc* 2010; **24**: 957-8; author reply 959-60.
  - 20 Aggarwal V, Kiran RB, Garg M, Khandelwal D — Transoral thyroidectomy, vestibular approach using two ports: A novel technique. *Thyroid Res Pract* 2017; **14**: 75-6.
  - 21 Kang SW, Jeong JJ, Nam KH, Chang HS, Chung WY, Park CS — Robot-assisted endoscopic thyroidectomy for thyroid malignancies using a gasless transaxillary approach. *J Am Coll Surg* 2009; 209: e1-7.
  - 22 Lee J, Lee JH, Nah KY, Soh EY, Chung WY — Comparison of endoscopic and robotic thyroidectomy. *Ann Surg Oncol* 2011; **18**: 1439-46.
  - 23 Kuppersmith RB, Holsinger FC — Robotic thyroid surgery: an initial experience with North American patients. *Laryngoscope* 2011; **121**: 521-6.
  - 24 Thankappan K, Dabas S, Deshpande M — Robotic retroauricular thyroidectomy: initial experience from India. *Gland Surg* 2017; **6**: 267-71.
  - 25 Lee J, Kang SW, Jung JJ, Choi UJ, Yun JH, Nam KH, *et al* — Multicenter study of robotic thyroidectomy: short-term postoperative outcomes and surgeon ergonomic considerations. *Ann Surg Oncol* 2011; **18**: 2538-47.
  - 26 Lang BH, Wong KP — A comparison of surgical morbidity and scar appearance between gasless, transaxillary endoscopic thyroidectomy (GTET) and minimally invasive video-assisted thyroidectomy (VAT). *Ann Surg Oncol* 2013; **20**: 646-52.
  - 27 Chaung K, Duke WS, Oh SJ, Behr A, Waller JL, Daniel J, *et al* — Aesthetics in Thyroid Surgery: The Patient Perspective. *Otolaryngol Head Neck Surg* 2017; **157**: 409-15.