

# A Surgical Technique to Avoid Injury to External Laryngeal Nerve during Thyroidectomy

K M AZIM A AHMAD A U HAQ M J ATHAR

Department of Surgery, K. E. Medical College, Lahore

Correspondence to Dr. Kh. Muhammad Azim, Associate Professor Surgery

The prospective study was conducted at surgical floor of Mayo Hospital, Lahore for a period of eight years. Thirty patients were included in the study. All patients having solitary nodule of thyroid underwent total lobectomy and isthmusectomy adopting a surgical technique for the safety of external laryngeal nerve. In the series external laryngeal nerve was visualized in 70% cases and in 30% cases it could not be visualized. Only two patients developed fatiguensness of voice after prolonged use postoperatively. No other complications were seen in the series.

**Keywords:** External laryngeal nerve, voice fatigue, lobectomy isthmusectomy

External laryngeal nerve is a branch of superior laryngeal nerve (a branch of the vagus). It is intimately associated with superior thyroid vessel and may be stretched by retractor or transected when superior pedicle vessels are divided during thyroidectomy<sup>1,2</sup>. Damage to this nerve causes denervation of cricothyroid muscle which results in change in pitch and volume of voice<sup>3</sup>.

The aims and objectives of this study are to highlight the incidence of injury to external laryngeal nerve which is much more common than the recurrent laryngeal nerve injury. The pulse of this study is to evaluate a surgical technique for the preservation of the function of the external laryngeal during thyroidectomy.

## Materials and methods

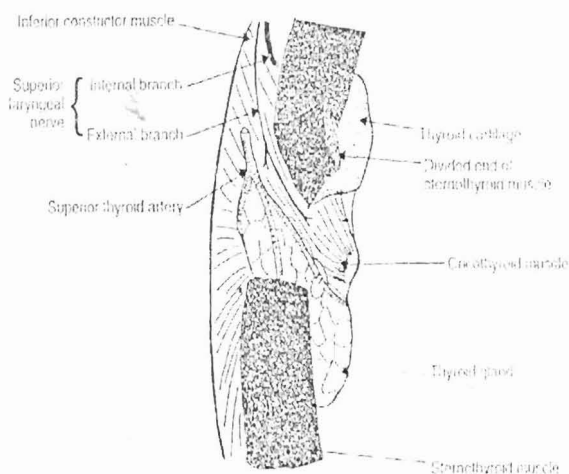
Thirty patients presented with solitary nodule of thyroid were included in the study, carried out at surgical floor in Mayo Hospital, Lahore from January 1995 to December 2002. These solitary nodules of thyroid were increasing in size and causing cosmetic and compression symptoms in addition to the suspicion of malignant neoplasm. Among them 10 patients were professor (teachers) and 10 professional speakers (maulanas), 5 were singer and remaining 5 were semi professional.

## Surgical technique

1. Thyroidectomy was performed through standard Kocher's collar incision.
2. Strap muscle were divided near their upper attachment in every case to have adequate exposure of the gland.
3. The divided proximal part of strap muscles lifted up with BabKock.
4. Created a space between the lateral wall of pharynx and upper medial surface of the thyroid lobe.
5. Small arterial twigs crossing the space were secured very precisely.
6. Superior pole of the thyroid pole grasped very gently with the Babkock. Slight traction applied laterally and caudally to demonstrate the cricothyroid space.

7. Anatomical display of superior thyroid arterial branches made. These are usually three in number. One run on the anterior surface of the pole and one on the posterior surface of the pole. One branch (neckless branch) runs down along the superior border of the isthmus.
8. Individual branches of superior thyroid artery tied with 3/0 or 4/0 vicryl, on the superior pole of thyroid precisely (tie on both sides and then divide it in between).
9. No use of diathermy at all in this area.
10. No traction on the branches of superior thyroid artery.
11. This is the only way one can avoid injury to external laryngeal nerve which is so closely associated with branches of superior thyroid artery.
12. Following exposure of recurrent laryngeal nerve, total lobectomy and isthmusectomy was done with predictable safety of parathyroid glands.
13. Patients were discharged on 3<sup>rd</sup> postoperative day after removal of stitches.

## Anatomy of external laryngeal nerve



## Results

Thirty patients were included in the series. Regarding profession, ten patients were teachers (professors) ten were khateeb, five were singers and remaining five were semi professionals.

All the patients underwent total lobectomy and isthmusectomy. External laryngeal nerve was visualized and identified in 70% of the cases. In 30% cases, it was not possible to identify the nerve because of its small size and variable course. In 28 patients, no postoperative complications were noted. Only two patients complained of voice change and fatigue of voice after prolonged use postoperatively. In these two patients indirect laryngoscopy was done which showed normal vocal cords.

## Discussion

External laryngeal nerve is the sole motor supply of the cricothyroid which is the tensor of vocal cords. Based on anatomical classification, the external laryngeal nerve may be of Type I i.e., ELN crossing the superior thyroid vessels 1cm above the superior thyroid pole and type II i.e. crossing the superior thyroid pedicle less than 1cm above the pole. Type II is further of two types. Type 2A i.e., above the pole but less than 1cm and type 2b i.e. crossing the vessels below the upper border of pole. Type 2b is at the highest risk<sup>2</sup>.

Damage to this nerve during thyroidectomy results in huskiness, hoarseness, weakness decreased range of pitch or volume and fatigue after extensive use. These changes tend only to be nuisance in most individuals but can be catastrophic in professionals like singers and professional speakers (teachers, khateeb).

The career of famous opera singer Amelita Galli-Curci ended abruptly following possible damage to external laryngeal nerve sustained during the thyroidectomy under local anaesthesia in 1935.

In our society, most of the individuals are uneducated and they do not report changes in the voice unless you ask for it except teachers or professional speakers. Injury to ELN during thyroid surgery is not uncommon. Most surgeons tend to avoid rather than expose and identify the ELN. It was thought that any patient who complained of voice change, was related to the recurrent laryngeal nerve damage. No routine indirect laryngoscopy used to be done in patients complaining of voice changes after operation. The incidence of external laryngeal nerve damage is much more higher than the incidence of recurrent laryngeal nerve damage which has been never realized before in our set up<sup>4,5,6,7</sup>.

In our study, 30% ELN were not identified which is comparable with other studies ranging from 15-25%<sup>8</sup>. In our study, effective prevention of iatrogenic ELN lesions during thyroidectomy was achieved only with attempt of intraoperative identification of the nerve, as supported by the literature<sup>9</sup>. Results with other surgical technique with

attempt to identify ELN are better when compared with other surgical techniques without an attempt to identify nerve<sup>10</sup>.

## Conclusion

The author describes a surgical technique which aids to identification and protection of ELN in majority of patients though it is not possible to identify nerve in every case because of its small size and variable course but reduce remarkably the incidence of ELN damage. This is important because permanent injury to this nerve can be a disaster, especially in singer and professional speakers who depend on control of pitch and a clear and forceful voice. Technique of mass ligation of superior thyroid vessels is absolutely absurd because it results in majority of the patients with ELN damage.

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