

## Non recurrent inferior laryngeal nerve - "A serious but avoidable threat to safe thyroidectomy"

Vipin Goel

Care Hospital Banjara Hills Hyderabad, India

\*Corresponding Author: Vipin Goel, Care Hospital Banjara Hills Hyderabad, India.

Received date: February 02, 2020; Accepted date: June 18, 2020; Published date: June 24, 2020

Citation: Vipin G. (2020) Non recurrent inferior laryngeal nerve-"A serious but avoidable threat to safe thyroidectomy". International Journal of Clinical Case Reports and Reviews. 2(4); DOI: 10.31579/2690-4861/016

Copyright: © 2020 Vipin Goel, This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

### Abstract

**Background:** Nonrecurrent inferior laryngeal nerve (NRILN) is a very rare anomaly and is prone to damage during thyroidectomies. Hence intraoperative techniques to identify and prevent inadvertent injury to the nerve is important.

**Case Reports:** We report case of right NRILN and discuss the anatomy of NRILN and ways to identify it and prevent injury to nerve.

**Conclusion:** High index of suspicion must be present to suspect NRILN, when RLN is not found in its usual anatomical position intraoperatively. No structure traversing transversely between the carotid artery and larynx should be cut if recurrent inferior laryngeal nerve (RILN) is not seen. Location of vagus medial to the common carotid artery indicates the presence of NRILN.

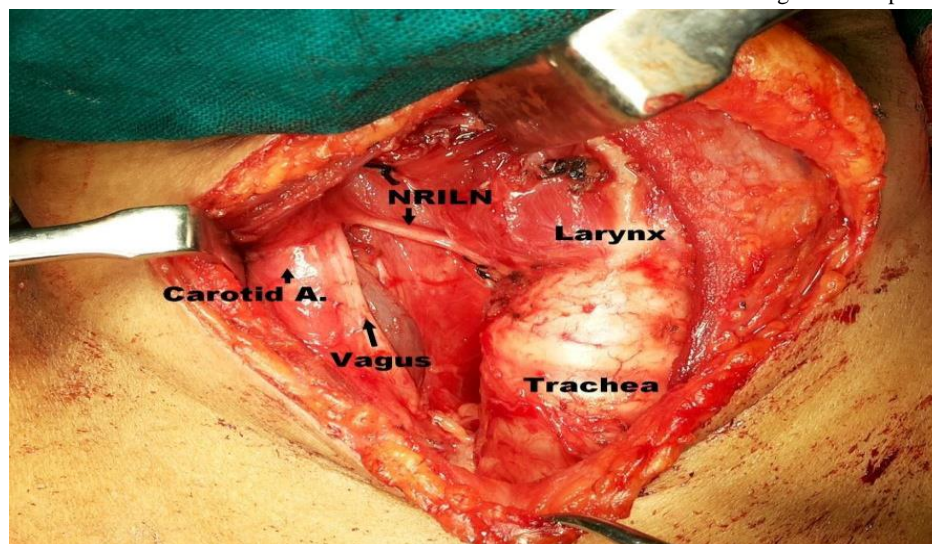
**Keywords:** nonrecurrent inferior laryngeal nerve; thyroidectomy

### Introduction

Variations in the anatomy of the thyroid gland anatomy, leading to injury to recurrent laryngeal nerve (RLN) during thyroidectomy are dreaded by even the most experienced surgeons. Non-recurrent inferior laryngeal nerve (NRILN) is one such rare anomaly. Though the incidence of NRILN has been found to be very low (0.3%-0.8%) on the right side and extremely low 0.004% on the left [1], every head and neck surgeon may, in their lifetime, come across this entity. We report case of right non-recurrent inferior laryngeal nerve and discuss the anatomy related to NRILN and ways to identify it, so as to prevent inadvertent injury.

### Case Reports

A 38 year old female with papillary carcinoma of thyroid on FNAC, planned for total thyroidectomy with central lymph node dissection. Intra-operatively, the right RLN was not found in the tracheoesophageal groove. Even after meticulous dissection when RLN was not found, Non-recurrent laryngeal nerve come to our mind. Dissection was done laterally and the Vagus nerve was identified first. Then, the origin of the inferior laryngeal nerve from vagus and the transverse non-recurrent course parallel to the superior thyroid artery till the tracheoesophageal groove was traced. Surgery was completed preserving Non-recurrent laryngeal nerve. There was no change in voice post operatively (Figure 1).



**Figure 1:** Post thyroidectomy intraoperative image showing the right NRILN arising from vagus laterally and directly entering the larynx. Note that the vagus is located medial to the common carotid artery.

## Discussion

Any surgeon operating on the thyroid should have thorough knowledge of the anatomic relations of the thyroid gland and their possible variations. When the RLN is not found in its usual position in the tracheoesophageal groove, the presence of a NRILN should be suspected.

Two types of NRILN have been described. Type 1 arises from the vagus and runs directly with the vessels of the superior thyroid pedicle. Type 2 follows a transverse path parallel to the inferior thyroid artery trunk and branches [2]. Both of these NRILN should be kept in mind.

The embryological development of RLN is dependent on the development of the aortic arch and supra-aortic arteries. Non-recurrence on the right side has been consistently associated with vascular anomalies like right subclavian artery arising directly from the aortic arch. On the left side, it is associated with situs inversus, loss of ductus arteriosus or left retro-esophageal subclavian artery [3, 4].

Duplex ultrasound has been found to be an easy and effective tool in preoperative identification of these associated vascular anomalies and help pre-surgical planning to prevent NRILN damage [5]. When CT, MR angiography and DSA are done for some other reason and shows some vascular anomalies as mentioned previously like situs inversus NRILN should be kept in mind. Duplex ultrasound, CT, MR angiography and DSA are not recommended routinely to identify NRILN [6, 7].

Intraoperatively, if RLN is not found in its normal course NRILN should always be kept in mind. Usually other than middle thyroid vein, no structure traverses transversely between the carotid artery and larynx. Intraoperatively, if RLN is not found, no structure traversing transversely between the carotid artery and larynx should be cut. In the absence of RLN in its usual position, if the presence of NRILN is not specifically looked for, injury to it during surgery is very likely [8]. The ipsilateral vagus should be dissected first to trace the NRILN. NRILN should be traced laterally from its origin from vagus to the point where it enters larynx medially. The location of the vagus medial to the common carotid artery also serves as an indicator of the presence of NRILN.

However, when a NRILN has been identified during surgery, further post-operative imaging studies to identify associated vascular anomaly is not recommended unless associated complaints like dysphagia are present [9].

## Conclusion

When RLN is not found in its usual anatomical position intraoperatively, NRILN should always be searched. Ipsilateral vagus nerve should be dissected first to look for the origin of NRILN. Location of the vagus nerve medial to the common carotid artery also indicates the presence of NRILN.

## References

1. Henry JF, Audiffret J, Denizot A, et al. (1988) The nonrecurrent inferior laryngeal nerve: review of 33 cases, including two on the left side. *Surgery*; 104: 977–984.
2. Stewart, Mountain, and Colcock. (1972) Non recurrent laryngeal nerve. *Brit. J. Surg*; 59:379-381.
3. Pisanu A, Pili S, Uccheddu A. (2002) Non-recurrent inferior laryngeal nerve. *Chir Ital. Jan-Feb*; 54(1):7-14.
4. Lee YS, Son EJ, Chang HS, Chung WY, Nam KH, Park CS. (2011) Computed tomography is useful for preoperative identification of nonrecurrent laryngeal nerve in thyroid cancer patients. *Otolaryngol Head Neck Surg. Aug*; 145(2):204-207.
5. Yetisir F, Salman AE, Çiftçi B, Teber A, Kiliç M. (2012) Efficacy of ultrasonography in identification of non-recurrent laryngeal nerve. *Int J Surg.*; 10(9):506-509.
6. Tartaglia F, Blasi S, Tromba L, Sgueglia M, Russo G, Di Matteo FM, Carbotta G, Campana FP, Berni A. (2011) Duplex ultrasound and magnetic resonance imaging of the supra-aortic arches in patient's with non recurrent inferior laryngeal nerve: a comparative study. *G Chir. May*; 32(5):245-250.
7. Varghese BT, Desai KP, Ramachandran A. (2013) Pre-operative prediction of a right non-recurrent laryngeal nerve by computed tomography. *J Laryngol Otol. May*; 127(5):525-527.
8. Liu LX, Wu LF, Xue DB, Meng XZ, Zhang WH, Jiang HC. (2006) The importance of nonrecurrent laryngeal nerve in thyroid surgery. *Zhonghua Wai Ke Za Zhi.*; 44:904–906.
9. A. Toniato, I. Merante Boschini, C. Pagetta, E. Casalide, M. Pellizzo. (2010) A "Pilot light" of right non-recurrent laryngeal nerve. *Acta Otorhinolaryngol Ital*; 30:107-109.