

Case Report

Non recurrent laryngeal nerve: be vigilant

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ABSTRACT

The nonrecurrent laryngeal nerve (NRLN) is a rare variant of the RLN, which results from the partial failure of pharyngeal apparatus during embryological development. It's a rare anatomical variation in which the nerve doesn't descend to the thorax and enters the larynx directly from the vagus nerve in the neck. It's an uncommon anatomical variation usually associated with subclavian artery abnormalities, so identification of these vascular anomalies before the surgery is important to avoid nerve injury. These anomalies lead to difficulty in finding the RLN and hence the chances of injury to the nerve are more. Lack of knowledge about the course of RLN, its anatomical variations and its relationship to the vital structures poses the risk of iatrogenic damage of the nerve. Most of the cases of NRLN are diagnosed intraoperatively, as there is no specific test for this. So, surgeons should always be vigilant about the NRLN during thyroid and parathyroid surgeries.

Keywords: Trachea, NRLN, Vagus nerve

INTRODUCTION

During thyroid surgery, the most important step is the preservation of RLN which is the branch of the vagus nerve.¹ RLN innervates all intrinsic muscles of the larynx except cricothyroid muscle and also gives sensory supply to the laryngeal mucosa below the level of the vocal cords. Trauma of this nerve unilaterally lead to irreversible hoarseness of voice and dyspnoea with stridor if bilateral damage is there. RLN mostly runs in the tracheoesophageal groove. On right side it loops around the subclavian artery in mediastinum and on the left side around the aortic arch to recur back in the neck. But in few cases, it does not recur, instead it takes a direct horizontal course straight from vagus nerve in neck when it called as nonrecurrent laryngeal nerve (NRLN).

It is a rare anatomical variation seen with a prevalence of about 0.5%. Due to its direct course, there are higher

chances of injury to the nerve during thyroid surgery. But this injury can safely be avoided by proper knowledge of anatomy.² Sometimes this NRLN is associated with right aberrant origin of subclavian artery. We are presenting three cases where NRLN was found intraoperatively during thyroid surgery and parathyroid surgery.

CASE REPORT

A 45-year-old female patient presented with history of progressive swelling in neck for 5 years. There were no compressive or functional features. Examination revealed a large midline swelling in the anterior aspect of neck, approximately about 10×8.5 cm in dimensions (Figure 1) and moving with deglutition suggestive of thyroid origin.

After proper workup, patient was planned for total thyroidectomy. During surgery, right RLN nerve could not be identified in its usual position. Further in neck

dissection showed presence of NRLN where nerve noted to originate from vagus nerve at right angle (Figure 3).



Figure 1: Patient with large midline swelling in the anterior aspect of neck.

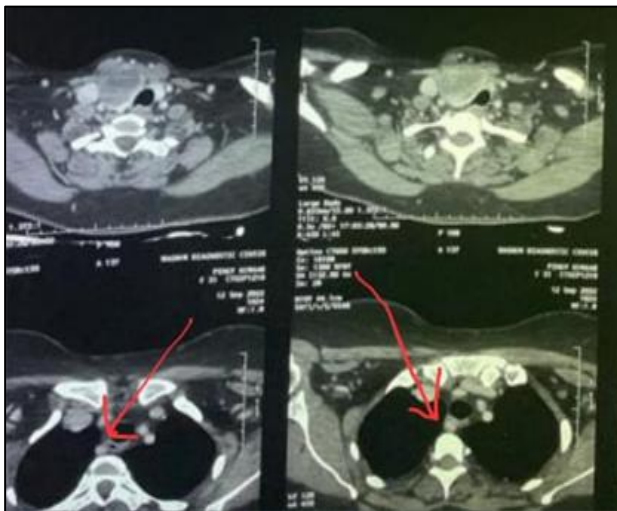


Figure 2: Contrast CT scan neck showing well defined heterogeneously enhancing lesion in both lobes of thyroid predominately left lobe and aberrant origin of right subclavian artery.

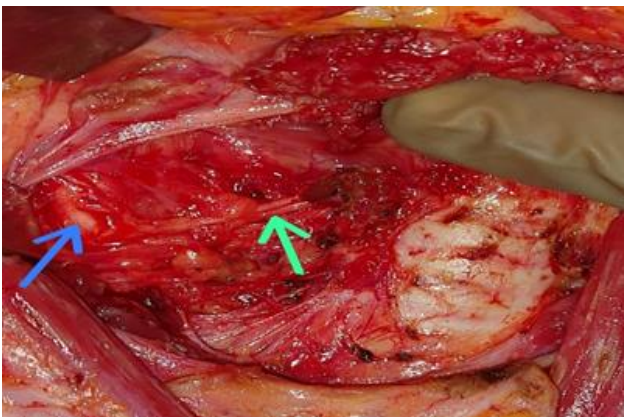


Figure 3: NRLN nerve originating from the vagus nerve at right angle, blue-vagus nerve, green-NRLN.

Sutureless total thyroidectomy with preservation of normal parathyroid glands with harmonic was done. The surgeries were uneventful with smooth recovery. Postop voice was normal. Histopathology confirmed benign multinodular goitre.

DISCUSSION

The NRLN is a rare variant of the RLN, which results from the partial failure of pharyngeal apparatus during embryological development. It's a rare anatomical variation in which the nerve doesn't descend to the thorax and enters the larynx directly from the vagus nerve in the neck.³ This was first reported by Stedman in 1823. This abnormality is more common on right side (0.3-0.8% of the population) than left (0.004%). Such anomalies can lead to difficulty in locating the nerve during thyroid surgeries and there are higher chances of it being injured during thyroid or other invasive procedure of the neck.

This anomaly is due to the impaired embryological development of the fourth, fifth, and sixth branchial arches. The RLN is sixth branchial arch nerve and is associated with the sixth arch arteries when right subclavian arises from the left side of the arch of aorta and runs posterior to the oesophagus, causing dysphagia lusoria. The RLN could not loop around subclavian artery and becomes non recurrent.

There are no direct signs or tests to detect NRLN, but its presence is suspected when associated findings like dysphagia lusoria are present. Preoperative CT scan helps in suspecting the presence of a NRLN by identifying the presence of an arteria lusoria and the absence of the brachiocephalic artery.⁴ Surgeon should keep in mind the probability of this nerve variation.

The ideal way to avoid the damage to the nerve during thyroid surgery is to identify the nerve with a bloodless and meticulous dissection, keeping in mind all the anatomical landmarks and also the possibility of any anatomical variation. Also, during thyroid surgeries no transverse or vertical band should be cut, unless the RLN is identified. Intraoperative nerve monitoring is also a useful tool for understanding the anatomy and physiology of the RLN.⁵

There are three different types of NRLN are described in the literature: Type 1, in which the nerve travel along the superior vascular pedicle of the thyroid gland. Type 2A, where the nerve travels parallel and superficial to the inferior thyroid artery. Type 2B is where nerve travels parallel and deep to the inferior thyroid artery.

CONCLUSION

NRLN is an uncommon occurrence and should be suspected in all thyroid surgeries with diagnosis of dysphagia lusoria or situs inversus. It is of utmost importance because failure to recognize it can lead to

iatrogenic injury to nerve. So, in all thyroid and parathyroid surgeries, even when there is no abnormal vasculature, the RLN should always be traced and dissected properly in order to avoid injury.

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