

Non-Recurrent Laryngeal Nerve - A Surgical Challenge

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INTRODUCTION

Both the cases discussed here had right sided NRLN, out of which one had associated aberrant right subclavian artery. None had iatrogenic nerve palsy. Dissection was difficult as during the routine procedure of dissection, the nerve was not found in its usual route and was found that the right laryngeal nerve was not recurrent and originated directly from the vagus nerve.

The non-recurrent laryngeal nerve (NRLN) is a rare embryologically derived variant of the recurrent laryngeal nerve and is found in 0.25 to 0.99% of patients who undergo thyroid surgery. On the right side, NRLN is found in 0.3% to 0.8% of patients and it is extremely rare on the left (0.004%).^[1-2] The right NRLN is found to be associated with an aberrant right subclavian artery (86.7%)

In experienced hands, meticulous dissection in the region of the tracheoesophageal groove will result in identification of RLN. In any case, if the nerve is not seen / found longitudinally along the tracheoesophageal groove, then dissecting transversely along the fascial spaces between the carotid sheath and the larynx, will allow identification of the presence of NRLN.

Recurrent laryngeal nerve is a branch of the vagus nerve that is associated with both motor function and sensation of the larynx. It supplies all the intrinsic muscles of the larynx except the cricothyroid muscles. The non-recurrent laryngeal nerve (NRLN) is a rare embryologically derived variant of the recurrent laryngeal nerve and occurs in 0.25 to 0.99% of patients who undergo thyroid surgery and was first reported by Steadman in 1823.^[3] on the right side, NRLN is found in 0.3% to 0.8% of patients and on the left side, it is extremely rare (0.004%).^[1-2] The right NRLN is found to be associated with an aberrant right subclavian artery (86.7%).^{[1],[4]}

The NRLN is usually an unexpected surgical discovery, specifically during thyroidectomy. Hence, adequate anatomic knowledge of the normal course and variations/types of NRLN, and careful dissection during surgery is necessary to prevent iatrogenic injury to the nerve.

We are reporting two cases of NRLN, which were identified while performing total thyroidectomy in patients diagnosed with papillary ca thyroid.

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PRESENTATION OF CASES

Case 1

A 19 years old lady presented at Head & Neck OPD of SGCC & RI with a mobile left-sided thyroid nodule (5 cm x 4 cm approx.) and palpable level II to IV left cervical nodes with 2 years history of gradual size progression.

There was no hoarseness nor any compressive symptoms. Clinically there was no retrosternal extension. Fibreoptic laryngoscopy examination showed normal vocal cord function. Ultrasonography of neck revealed a solitary, solid 4 x 3 cm nodule in the left lobe of thyroid with multiple left level 2 to 4 & level 6 cervical nodes (none greater than 6 cms). The USG findings were corroborated with CECT neck (to find out the relation of the great vessel with the enlarged left cervical nodes). On CECT neck, it seemed that the left IJV was encased by left level 2A & 3 neck nodes but carotid artery was free and also the nodes seemed to be adherent to left sternocleidomastoid). She was found to be euthyroid. FNAC from the thyroid lump was suggestive of papillary carcinoma of thyroid.

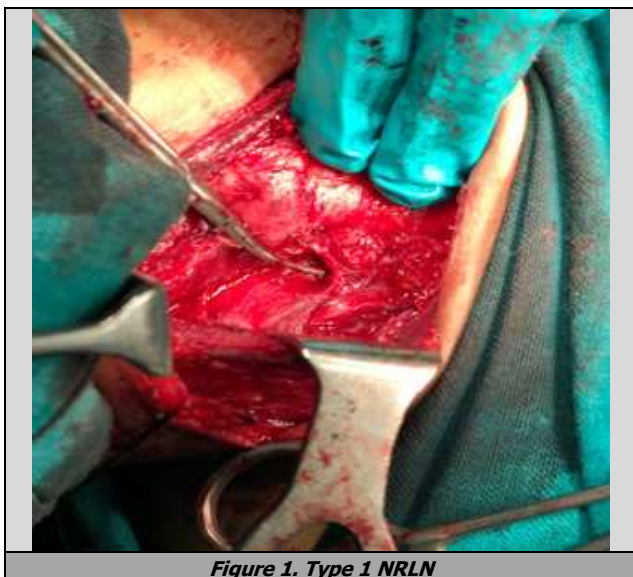


Figure 1. Type 1 NRLN

This patient underwent Total thyroidectomy with left comprehensive neck dissection (left level 2 to 5 cervical nodes were dissected out along with left sternocleidomastoid which was involved in extra nodal extension) and parathyroid preservation. Bilateral central compartment neck dissection was carried out. The left recurrent laryngeal nerve was found in the left tracheoesophageal groove in a recurrent fashion and the right recurrent laryngeal nerve was not found in a recurrent fashion, as nerve was not seen near the tracheoesophageal groove. Vigilant dissection revealed the right RLN to be non-recurrent (the nerve transversely running medially to the cricothyroid joint (Figure 1). This NRLN was not associated with presence of aberrant right subclavian artery. The nerve was carefully preserved. The postoperative period was uneventful with no features of hypocalcaemia during postoperative period and her voice was normal post op. One month postoperatively, USG neck, whole body I¹³¹ scan was

done, which revealed very small amount of postoperative residual thyroid tissue at thyroid bed with no uptake elsewhere in the body. She has been scheduled for post op radioiodine ablation therapy.

Case 2

A 37 years old lady presented at Head & Neck OPD of SGCC & RI with a solitary thyroid nodule involving right lobe with no complaints of hoarseness or compressive symptoms. F.O.L. examination showed normal vocal cord function. Ultrasonography of the neck revealed a solitary, solid 3.5 x 2.5 cm nodule in the right lobe of thyroid with no significant enlarged neck nodes. She was euthyroid & FNAC from the thyroid lump was suggestive of papillary carcinoma of thyroid. She was taken up for Total thyroidectomy & elective central compartment neck dissection was done as 2 to 3 sub centimetre pigmented nodes were note at level 6. During the dissection, the left recurrent laryngeal nerve was found in the left tracheoesophageal groove in a recurrent fashion and the right recurrent laryngeal nerve was not found in a recurrent fashion as nerve was not seen near the tracheoesophageal groove. Meticulous dissection was done on a medial to lateral direction and cranially, and the right RLN was found to extend in a non-recurrent manner (the nerve transversely running medially to the cricothyroid joint (Figure 2). This NRLN was interestingly associated with presence of aberrant right subclavian artery. The nerve was preserved without any iatrogenic injury. Post-operative period was uneventful with normal voice. This patient's whole body I¹³¹ scan is awaited.

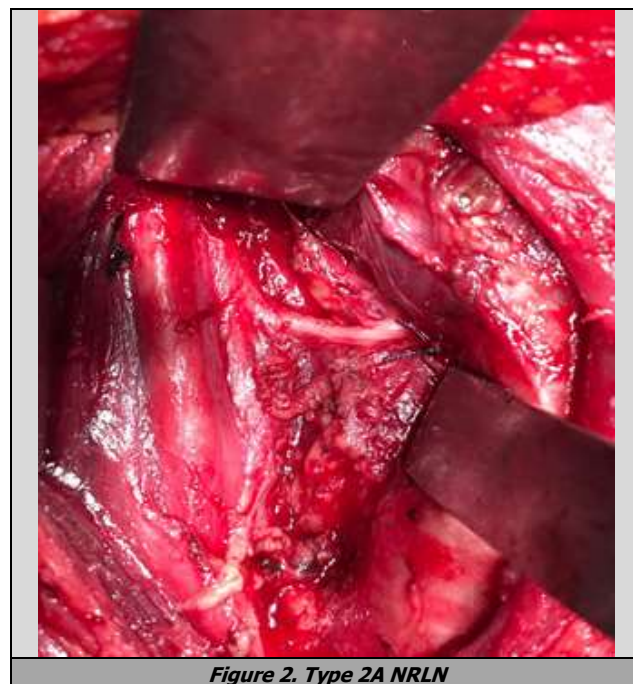


Figure 2. Type 2A NRLN

PATHOLOGICAL DISCUSSION

The non-recurrent laryngeal nerve (NRLN) is a rare embryologically derived variant of the recurrent laryngeal nerve.

It is found in 0.25% to 0.99% of patients who appear for thyroid surgery. Embryologically, the right subclavian artery originates from the 4th arch structure and the RLN originates from the 6th arch structure. When the heart descends during embryogenesis, it drags the 6th arch structure along with. Therefore, the right subclavian artery becomes anomalous resulting in the failure of descending of RLN would occur and becomes NRLN.^[5]

Types of NRLN^[6]

- Type 1- The NRLN arises directly from the vagus and travels with the superior thyroid pedicle vessels.
- Type 2A- The NRLN travels transversely, parallel and superficial to the trunk of the inferior thyroid artery.
- Type 2B- The nerve travels in a transverse path parallel, but deep to or between the branches of the inferior thyroid artery.

Presence of NRLN is extremely rare. Hence, lack of vigilance and awareness of the possibility of these rare situations can result in iatrogenic RLN injury. Therefore, we need to be cautious in patients who were diagnosed with dysphagia lusoria and needs to undergo for thyroid surgery because in these cases, there is extremely high chance of presence of NRLN. Therefore, in experienced hands, meticulous dissection in the region of the tracheoesophageal groove will result in identification of RLN. In any case, if the nerve not seen/found longitudinally along the tracheoesophageal groove, then dissecting transversely and craniocaudally along the fascial spaces between the carotid sheath and the larynx and also meticulous handling of the inferior thyroid pedicle and its associated structures, will rule out any scope of inadvertent injury, allow identification of the presence of NRLN and prevent iatrogenic nerve palsy. The use of surgical loupes and nerve monitors may be of additional help during dissection, but can never be the substitute of mental preparedness of such findings, although

rare. This report is aimed at highlighting the occurrence of these rare cases within the span of a year.

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Declaration forms given by the authors are available with the full text of the article at jebmh.com

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