Abstract:
The anatomy of the recurrent laryngeal nerve is important in thyroid surgery. Though rare, knowledge of the non-recurrent laryngeal nerve is necessary to prevent accidental injury.

Keyword: non-recurrent laryngeal nerve, anatomy

A rare clinical entity
35 year old man presented with a swelling in the front of the neck on the right side for 3 months. The swelling did not increase in size. He had no symptoms of hypo or hyperthyroidism. He had no pressure symptoms or change in voice. He had no other co-morbidities. On local examination there was a 4x5cm swelling in the right side of the neck which moved on deglutition. The swelling was nodular and firm in consistency. There was no retrosternal extension. There were no cervical lymph nodes. Ultrasound of the neck was done which showed a hypoechoic nodule measuring 2.5x1.7cm with peripheral halo in the right lobe of thyroid gland. Left lobe and the isthmus were normal. There were no significant lymph nodes seen. The impression was of a solitary nodule in the right lobe of probable benign etiology. Fine Needle Aspiration Cytology showed cellular smears from right lobe of thyroid - neoplasm with focal Hurthle cell features. He underwent total thyroidectomy. The intra-operative findings were 2cm hard nodule on the right lobe of thyroid. Intra – operatively, the recurrent laryngeal nerve on the right side could not be found in the usual location. After careful and meticulous dissection, he was found to have a non – recurrent laryngeal nerve on the right side. Post operative histopathological examination showed Papillary carcinoma of the right lobe of thyroid gland. The maximum tumour dimension was 2cm. There was no capsular infiltration or extrathyroidal tumour extension. The left lobe was free of tumour.
The picture indicates the non recurrent laryngeal nerve arising directly from the vagus nerve. The type of non recurrent laryngeal nerve seen here was Type 2A.

**Recurrent laryngeal nerve:**
The normal anatomy of the recurrent laryngeal nerve is as follows\(^1\). It is a branch of the vagus nerve (tenth cranial nerve) which provides motor function and sensation to the larynx. It is the nerve of the 6th Branchial Arch. It descends into the thorax before rising up between the trachea and esophagus to reach the neck. The left laryngeal nerve is longer - loops under the arch of the aorta, posterior to the ligamentum arteriosum. The right branch loops around the right subclavian artery. This nerve supplies all laryngeal muscles except for the cricothyroid, which is innervated by the external branch of the superior laryngeal nerve. The right recurrent laryngeal nerve passes behind, above or between the branches of the right inferior thyroid artery. It is usually looked for in this location. Normal Anatomy of the Recurrent Laryngeal Nerve\(^2,3\)

**Normal Anatomy Of the Recurrent Laryngeal nerve**
The non recurrent laryngeal nerve is an extremely rare condition which is more common on the right side as compared to the left. The Incidence on the right side is about 0.6% while on the left, it is even more rare, occurring in only about 0.004%.\(^4\)

**Variations in the position of the recurrent laryngeal nerve**

**Variations in the position of the Recurrent Laryngeal Nerve**

Three types can be distinguished\(^4\):
Type 1 NRILN arises directly from the vagus and runs together with the vessels of the superior thyroid pedicule; Type 2A NRILN follows a transverse path parallel to and over the trunk of the inferior thyroid artery; Type 2B NRILN follows a transverse path parallel to and under the trunk or between the branches of the inferior thyroid artery.

**Prevention of injury to the non-recurrent laryngeal nerve**
The non-recurrent laryngeal nerve is prone for injury if careful dissection is not done during the operation. It has been suggested that other than the middle thyroid vein, no other transverse structures
should be cut before identifying the recurrent laryngeal nerve\(^6\).

**Embryology\(^7,\^8\):**

Embryogically, the non recurrent laryngeal nerve seems to be a vascular disorder known as arteria lusoria where the fourth right aortic arch is abnormally absorbed. In these cases the right subclavian artery originates as a branch of a normal aortic arch and passes upward to the right behind the esophagus. The incidence is about 0.5 to 2% of the general population. Even though it is usually asymptomatic, nearly 5% of these patients experience dysphagia (dysphagia lusoria) or symptoms related to artery tortuosity, and premature atherosclerosis. On the left side, a non-recurrent ILN has only been observed in cases of dextrocardia (0.004%).

**Diagnosis\(^9\):**

CT scan or magnetic resonance imaging (MRI) can be done to visualize the arteria lusoria. But the incidence is too low to warrant regular screening. This can be done for patients who present with dysphagia (dysphagia lusoria). There have not yet been studies which have shown that the systematic use of pre-operative imaging studies can minimize this risk.

**Conclusion:**

Though rare, non recurrent laryngeal nerve can occur in patients and can be found intraoperatively. If damaged during the surgery it can cause temporary or permanent hoarseness in patients adding to their post operative morbidity. Hence knowledge of the anatomy can prevent injury to the nerve during surgery. It is important to remember the abnormal location of the recurrent laryngeal nerve. This is important to prevent morbidity in patients.

**Bibliography:**

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