

Non-recurrent laryngeal nerve and aberrant subclavian artery in thyroidectomy

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DESCRIPTION

A woman in her 50s had a 10-year history of right thyroid nodule and underwent regular ultrasound review for this period of time. In the latest ultrasound scan, it revealed a 3 cm thyroid nodule with suspicion of malignancy (U4). She was referred to our hospital for assessment. She complained of a right neck lump and had no symptoms of nerve palsy including voice change, choking or compressive symptoms. She has no personal risk factors of thyroid cancer. On examination, there was a 3 cm right thyroid mass with no cervical lymphadenopathy. Flexible endoscopy revealed normal and mobile vocal cords. Two fine-needle aspiration cytology were arranged and all showed inconclusive results due to paucity of the sample (Thy 1). Core biopsy was then performed with the finding of follicular neoplasm but unable to differentiate between an adenoma or carcinoma. She underwent diagnostic right hemithyroidectomy.

Preoperative MRI (figure 1) showed a 28 mm right thyroid tumour with no nodal disease. An aberrant right subclavian artery was also identified looping behind the right common carotid artery and behind the right lobe of thyroid.

Intraoperatively a nerve in a horizontal position was identified which entered the larynx at the cricothyroid joint (figure 2). This was confirmed to be a non-recurrent laryngeal nerve with the use of the handheld nerve stimulator (nerve stimulator Neuro-Pulse, Bovie Medical, Florida, USA) and palpation of laryngeal muscle contraction.

Postoperative recovery was uneventful and she had a good voice. She was discharged on the first postoperative day. The histopathology revealed adenomatoid nodule.

Recurrent laryngeal nerve supplies innervation to all of the intrinsic muscles of the larynx, except for the cricothyroid muscles, as well as sensation to the larynx below the level of the vocal cords. Typical right non-recurrent laryngeal nerve exits the vagus nerve at the root of the neck, travels anteriorly to posteriorly looping around the right subclavian artery and ascends along the tracheoesophageal groove until it reaches the cricothyroid junction. Non-recurrent laryngeal nerve is a rare variant of recurrent laryngeal nerve and occurs in 0.52%–0.7% of cases.¹ Non-recurrent laryngeal nerve occurs mostly on the right side. The non-recurrent variant exits directly from the vagus nerve and supplies the larynx. It is associated with aberrant right subclavian artery, which was present in 89.3% of cases, according to a meta-analysis.¹ During embryological development, the existence

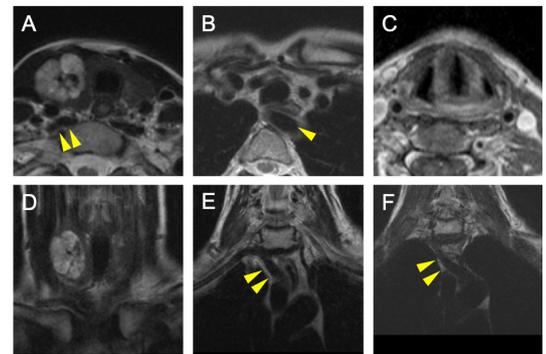


Figure 1 Preoperative MRI scan of the neck. Yellow arrowhead: right aberrant subclavian artery. (A) Axial T2 showing right thyroid nodule, with high riding right subclavian immediately behind, close to tracheoesophageal groove. (B) Axial T2 showing aberrant subclavian behind the cervical oesophagus and trachea. (C) Axial postcontrast T1 image of the larynx. (D) Coronal T2, showing thyroid nodule. (E) Coronal T2 showing high riding subclavian in supraclavicular fossa, at the same level as the thyroid. (F) Coronal T2 (maximum intensity projection), showing the aberrant, infundibular origin of the right subclavian artery, coursing across the midline towards the right root of the neck.

of an aberrant right subclavian artery permits the cephalad migration of the recurrent laryngeal nerve, leading to a right-sided non-recurrent laryngeal nerve.² Aberrant right subclavian artery, is the most common aortic arch anomaly, occurring

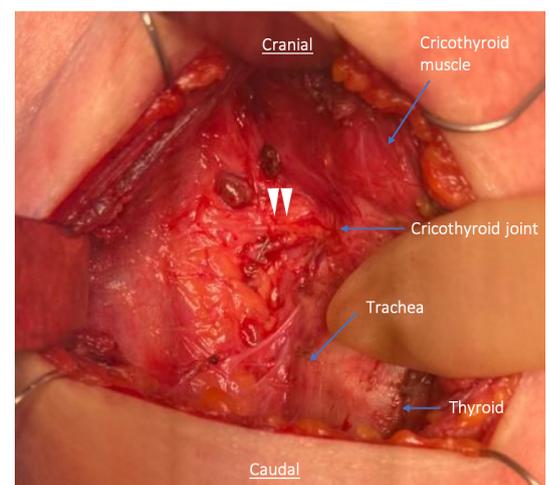


Figure 2 Intraoperative photo. White arrowhead: right non-recurrent laryngeal nerve. It was identified lying in a horizontal position and entering the larynx at the cricothyroid joint.



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Images in...

in 0.5%–2% of individuals.³ It is also known as arteria lusoria, which ‘lusoria’ is derived from *lusus naturae* (Latin for ‘freak of nature’). It arises directly from the aortic arch distal to the left subclavian artery instead of originating from the brachiocephalic artery and traverses the midline posterior to the oesophagus and trachea. The majority of the cases of aberrant right subclavian artery are asymptomatic, but around 10% of people may present with tracheoesophageal symptoms, mostly as dysphagia, as known as ‘dysphagia lusoria’ or weight loss.

Recurrent laryngeal nerve injury is a serious complication in thyroid surgery which causes vocal cord paralysis and has a profound impact on a patient’s quality of life. The anomalous position of the non-recurrent laryngeal nerve makes it more vulnerable to iatrogenic injury in thyroid surgeries if not identified properly. Up to a sixfold increase in intraoperative nerve injury can be resulted if they had an undetected non-recurrent laryngeal nerve, as reported by Toniato *et al.*⁴ In cases of more demolitive or extensive thyroid surgeries, for example, total thyroidectomies with central neck dissection, the

risk of iatrogenic nerve injury is even higher, making it more important to identify the presence of non-recurrent laryngeal nerve preoperatively.⁵

Contributors YKL participated sufficiently in the conception of the idea, development of the intellectual content, design, writing and final approval of the manuscript. WY participated sufficiently in the conception of the idea, development of the intellectual content, revising and final approval of the manuscript. RG participated sufficiently in the conception of the idea, development of the intellectual content, revising and final approval of the manuscript. DK participated sufficiently in the conception of the idea, development of the intellectual content and final approval of the manuscript.

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Case reports provide a valuable learning resource for the scientific community and can indicate areas of interest for future research. They should not be used in isolation to guide treatment choices or public health policy.

Learning points

- ▶ Recurrent laryngeal nerve injury is a serious complication in thyroid surgery which causes vocal cord paralysis and has a profound impact on a patient’s quality of life.
- ▶ The anomalous position of the non-recurrent laryngeal nerve predisposes the nerve to injury during thyroidectomy.
- ▶ Up to a sixfold increase in intraoperative nerve injury can be resulted if they had an undetected non-recurrent laryngeal nerve. Preoperative imaging carries paramount importance in diagnosing aberrant subclavian artery and allows anticipation of non-recurrent laryngeal nerve before surgery and facilitates surgical planning to prevent intraoperative nerve injuries.

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