

The anterior recurrent laryngeal nerve: an uncommon topographical variation observed during thyroid surgery

S.K. Zachariah¹, S. Rajeeve¹, S. Kurup²

¹ Department of General, Gastrointestinal & Laparoscopic Surgery, MOSC Medical College, India

² Department of Anatomy, MOSC Medical College, India

Keywords: Recurrent laryngeal nerve; thyroidectomy

Introduction

Safeguarding the recurrent laryngeal nerve (RLN) is crucial during thyroid surgery. Nerve paralysis due to accidental injury of the RLN, can occur in 1-2% of cases, even by experienced surgeons [1]. Common variations of the RLN include the non-recurrent laryngeal nerve and extra-laryngeal bifurcation. A rare but well documented entity is the anterior recurrent laryngeal nerve (ARLN). We present this unusual variation of the position of the right RLN, in a 57 year old female who underwent thyroidectomy for a benign multinodular goitre.

Case Report

A 57 year old euthyroid female presented with a benign multinodular goitre of 10x8x4cm in maximum dimensions, of 15 years duration. Indirect laryngoscopy revealed normal bilateral vocal cords.

During thyroidectomy, the left recurrent laryngeal nerve and parathyroid glands were identified and preserved. On lifting the right lobe medially an unusual occurrence was identified. The right RLN was found running superficially and anteriorly over the lower part of the thyroid lobe (Figure 1). The Zuckerkandl's tubercle (ZT) served as an important landmark to confirm the position of the RLN. The nerve had to be lifted off the gland and meticulously dissected away to deliver the lobe. The nerve was traced down into the root of the neck confirming that it was not a non-recurrent laryngeal nerve. Its position was superficial to the inferior thyroid artery and behind the inferior parathyroid gland. Post-operatively the patient developed hoarseness of voice due to paralysis of the right vocal cord, as confirmed by indirect laryngoscopy. This probably occurred due to traction when the nerve was being lifted off the gland. Her voice returned to normal after 5 weeks.

Discussion

The RLN usually runs behind the thyroid gland in the tracheo-

oesophageal groove. Dissections of human cadavers have shown that the paths of the recurrent laryngeal nerves were occasionally different from that shown in the standard literature [2]. In a recent study, Shen et al [3] demonstrated that the RLN lies in positions away from the tracheo-oesophageal groove in 43 patients.



Figure 1. The right recurrent laryngeal nerve (white arrows) can be seen running anteriorly and superficially over the thyroid gland. Normally the RLN should be in a plane behind the lobe in the trachea-oesophageal groove. The Zuckerkandl's tubercle (ZT) serves as a pointer to the RLN. The black arrow denotes position of the inferior thyroid artery.

Hunt et al [4] have shown that in rare situations the RLN ascends anterolateral to the trachea away from the trachea-oesophageal groove and consequently remains widely exposed and vulnerable to injury during surgery. Distortion from large nodules can cause the RLN to lie anteriorly over the thyroid gland [5]. Gurleyik [6] reported two cases wherein the RLN was pushed laterally by an enlarged ZT.

In our centre we routinely identify and trace the course of the RLN for all thyroidectomies. The RLN usually appears like a white ribbon with a thread of fine blood vessels running over its surface. We were able to identify the nerve by its characteristic appearance although it was in a totally unexpected position. The nerve could have otherwise been easily overlooked and seriously injured.

Conclusion

Routine meticulous identification of the RLN during thyroidectomy is important to help identify rare topographical

Correspondence: S.K. Zachariah

E-mail: skzach@yahoo.com

DOI: <http://10.4038/sljs.v34i2.8270>



variations such as the anterior recurrent laryngeal nerve.

References

1. Veyseller B, Aksoy F, Yildirim YS, Karatas A, Ozturan O. Effect of recurrent laryngeal nerve identification technique in thyroidectomy on recurrent laryngeal nerve paralysis and hypoparathyroidism. *Arch Otolaryngol Head Neck Surg*. 2011 Sep; 137(9): 897-900.
<http://dx.doi.org/10.1001/archoto.2011.134>
2. Steinberg JL, Khane GJ, Fernandes CM, Nel JP. Anatomy of the recurrent laryngeal nerve: A redescription. *J Laryngol Otol*. 1986 Aug; 100(8): 919-27.
<http://dx.doi.org/10.1017/S0022215100100325>
3. Shen C, Xiang M, Wu H. Routine exposure of recurrent laryngeal nerve in thyroid surgery can prevent nerve injury. *Neural Regeneration Research*. 2013; 8(17): 1568-75.
4. Hunt PS, Poole M, Reeve TS. A reappraisal of the surgical anatomy of thyroid and para-thyroid glands. *Br J Surg*. 1968 Jan; 55(1): 63-6.
<http://dx.doi.org/10.1002/bjs.1800550119>
5. Thompson NW, Demers M. Exposure is not necessary to avoid the recurrent laryngeal nerve during thyroid operations In Simmons RL, Udekwu AO (eds). *Debates in Clinical Surgery, Chicago, Year Book*. 1990; 1(1): 207-219.
6. Gurleyik E. Two Cases of Enlarged Zuckerkandl's Tubercle of the Thyroid Displacing the Recurrent Laryngeal Nerve Laterally. *Case Rep Med*. 2011;2011:303861.

Key Points:

- The course of the RLN can be highly variable and different from standard descriptions.
- The right sided nerve is at a higher risk of injury due to its more frequent anatomical variations.
- The Zuckerkandl's tubercle is a helpful landmark for identification of the RLN.
- Distortion from large nodules can cause the RLN to lie anteriorly over the thyroid gland or away from the trachea-oesophageal groove; hence a high index of suspicion should be exercised when dealing with any anatomical structure that looks like the RLN even if it is situated in an unusual location.