International Research Journal of Education and Technology
Peer Reviewed Journal
ISSN 2581-7795

External Branch of the Superior Laryngeal Nerve and its importance in Neck Surgery

Mr.Anshuman Singh,Research Scholar, Malwanchal University

Prof. Dr. Pawan Kumar ,Research Supervisor, Malwanchal University

Introduction

Along with an internal branch that originates from the superior laryngeal nerve, the EXTERNAL BRANCH OF THE SUPERIOR LARYNGEAL NERVE (EBSLN) is considered to be one of the uppermost branches of the 10th cranial nerve (SLN). The EBSLN travels dorsolaterally until it reaches the carotid arteries, then it crosses them and finally it travels close to the superior thyroid artery (STA) in the larynx while remaining profound to both of these vessels the entire time. When performing neck surgery, it is essential to understand the topographical relationship that exists between the STA and the upper pole of the thyroid gland in order to locate the EBSLN. When these two landmarks are taken into consideration, identifying and protecting the nerve is a straightforward process. After sending branches to the pharyngeal plexus and the inferior pharyngeal constrictor, the EBSLN finally comes to an end in the cricothyroid muscle, which is located in the upper part of the neck. In spite of this, there is evidence that the EBSLN contains afferent fibres that act as a mediator for impulses coming from the cricothyroid joint and the mucous lining that is contained within the cricothyroid membrane. In addition, a number of authors describe the EBSLN as providing supplementary motor innervation to a number of the intrinsic laryngeal muscles. However, in order to answer that question, additional research is required.

Despite this, it is abundantly clear that iatrogenic EBSLN lesions are a great deal more common than is generally acknowledged.

During surgery, an effort should be made to locate the EBSLN because damage to this nerve can cause alterations, both temporary and permanent, in the quality of the patient's voice or in their ability to regurgitate food. Postoperative aspiration and dysphagia are significantly less likely to occur when there is adequate sensory innervation of the supraglottic area. This is especially true in partial laryngectomies. There is currently a lack of clarity and

confusion regarding the data pertaining to the precise topography of the EBSLN. Even the proportion of patients in whom the EBSLN can be identified ranges from 10 to 80 percent, according to the reports that have been made. As a consequence of this, the objectives of this research were to identify the path taken by the EBSLN in a sufficient number of participants and to come up with a system for classifying the nature of the connection that exists between the EBSLN, the STA, and the upper pole of the thyroid gland.

Methodology

In the anatomy lab of Index Medical college, 50 human bodies of both sexes were used, with ages ranging from 40 to 80 years. Hemilarynges were removed from each of these bodies, and then the bodies were prepared for use in anatomical dissection courses as is customary (4 percent phenolic acid and 0.5 percent formaldehyde).Only specimens that did not have any signs of severe abnormality in that region, such as enlarged thyroid glands or any other abnormality, were accepted. Dissection was performed on the anterior triangles of the neck, and the surgeon immediately documented his findings. In order to verify the data, the heads of cadavers were severed from the necks at the atlanto-occipital articulation, with the viscera of the neck remaining attached to the respective heads. Following these supplementary tests, the EBSLN's path and the topographical relations of its surrounding area were able to be categorised unequivocally into fifty hemilarynges. Within 8 hemilarynges, an injury occurred to the EBSLN while they were preparing. After all of the surrounding soft tissue that holds the nerve in position had been dissected in three different hemilarynges, it was difficult to determine the type of EBSLN that was present in any of the cases.

Results

Due to the fact that the results obtained by Studyr and those obtained by Sam et al differ in a number of ways, it was necessary to establish slightly different categories. Based on the information that we gathered, we classified the topographical relationship that exists between the EBSLN, the STA, and the upper pole of the thyroid gland into a total of four distinct groups.

When a person has type 1, the EBSLN travels more than one centimetre cranial to the upper pole of the thyroid gland after crossing the STA. This is clearly the most common type that we found in our specimens, as it was found in 25 of them, which is a percentage of 50 percent. The three preparations mentioned above, in which we had difficulty typing, most likely belonged to type 1 as well.

In type 2, the EBSLN travels less than one centimetre cranial to the upper pole of the thyroid gland before crossing the STA. Twenty percent of the hemilarynges in our sample, which totaled ten different preparations, were easily identifiable as type 2 specimens.

When type 3 is present, the EBSLN travels across the STA while being concealed by the upper pole of the thyroid gland (total of 10preparations in our study).

In cases classified as type 4, the EBSLN does not traverse the main trunk of the STA at any point; rather, it remains dorsal to the artery up until the point at which it ramifies. In the material that we examined, there were a total of 8 hemilarynges of that type (16 percent). Even though the EBSLN does not cross the STA in these circumstances, it is still very easy to locate because it runs parallel to the artery and is slightly more profound and dorsal to it than the STA.

The prevalence of type 1 was readily apparent across the entirety of the fifty hemilarynxes that we dissected. It is not possible to predict the path of the EBSLN on the other side of the neck based on the topographical relationship of the nerve on one side of the neck. On both sides, we found independent occurrences of the types that we defined. However, other than the four types of EBSLN courses described above, there was no other type that could be found.

In order to acquire quantitative information regarding the connection between the SLN and the common carotid artery, the distance that separates the SLN

from the vagal nerve and the bifurcation of the common carotid artery was measured. This allowed for the acquisition of the aforementioned information.

The distance that separates these two clearly defined anatomical landmarks can be anywhere from 2.9 centimetres to 5.6 centimetres, with the average distance being 4.1 centimetres on the right side and 4.27 centimetres on the left side.

Conclusion

Our findings point to the possibility of classifying the topographical differences along the EBSLN, which is a strong indication of this possibility. Due to the fact that this investigation included fifty specimens, it is highly improbable that the nerve will follow a path that is distinct from those that are covered by our classification. As a result, we believe that having a precise understanding of the relationship between the EBSLN, the STA, and the upper pole of the thyroid gland, as it is presented in this article, may assist in the identification of the nerve during neck surgery.

Reference

1. Sun H, Wu CW, Zhang D, Makay Ö, Zhao Y, Carcofaro P, Kim HY, Dionigi G, Pino A, Caruso E, Pontin A, Pappalardo V. New Paradigms for Neural Monitoring in Thyroid Surgery. SurgTechnol Int. 2019 May 15;34:79-86.

2.Cirocchi R, Arezzo A, D'Andrea V, Abraha I, Popivanov GI, Avenia N, Gerardi C, Henry BM, Randolph J, Barczyñski M. Intraoperative neuromonitoring versus visual nerve identification for prevention of recurrent laryngeal nerve injury in adults undergoing thyroid surgery. Cochrane Database Syst Rev. 2019 Jan 19;1:CD012483.

3. Bakalinis E, Makris I, Demesticha T, Tsakotos G, Skandalakis P, Filippou D. Non-Recurrent Laryngeal Nerve and Concurrent Vascular Variants: A Review. Acta Med Acad. 2018 Nov;47(2):186-192.

4. Williamson AJ, Shermetaro C. StatPearls [Internet]. StatPearls Publishing; Treasure Island (FL): Aug 11, 2021. Unilateral Vocal Cord Paralysis.

5. Espinosa MC, Ongkasuwan J. Recurrent laryngeal nerve reinnervation: is this the standard of care for pediatric unilateral vocal cord paralysis? CurrOpinOtolaryngol Head Neck Surg. 2018 Dec;26(6):431-436

6. Mahabadi N, Goizueta AA, Bordoni B. StatPearls [Internet]. StatPearls Publishing; Treasure Island (FL): Jul 26, 2021. Anatomy, Thorax, Lung Pleura And Mediastinum.

7. Daggumati S, Panossian M D H, Sataloff M D D M A F A C S RT. Vocal Fold Paresis: Incidence, and the Relationship between Voice Handicap Index and Laryngeal EMG Findings. J Voice. 2019 Nov;33(6):940-944.