CASE REPORT

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A CASE OF ATYPICAL ORIGIN OF SUPERIOR LARYNGEAL ARTERY: ANATOMICAL AND CLINICAL RELEVANCE

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Abstract. *The superior laryngeal artery (SLA) is considered a typical branch of the superior thyroid artery and serves as a primary source of blood supply of the larynx. The present case describes an atypical origin of the left SLA from the external carotid artery – a rarely observed anatomical variant. The review of literature reveals multiple documented variations in SLA origin with important clinical relevance for surgical procedures, such as thyroidectomy, laryngectomy, and targeted intra-arterial chemotherapy for laryngeal cancer. The detailed knowledge of SLA variations reduces the risk of surgical and postoperative complications in the neck region.*

Key words: *superior laryngeal artery, external carotid artery, variation, clinical significance*

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INTRODUCTION

The superior laryngeal artery (SLA) is one of the main sources of blood supply of the larynx. It is described as a branch of the superior thyroid artery (STA) – the first anterior division of external carotid artery (ECA). SLA passes beneath the thyrohyoid muscle and penetrates through the thyrohyoid membrane to supply the mucosa and muscles in the area of laryngeal vestibule and ventricle [1]. Topographically, SLA is accompanied by the superior laryngeal nerve providing sensory innervation of the upper larynx, as well as motor innervation of the cricothyroid muscle [2]. The incidence of SLA with origin from STA ranges between 68% [2] and 94% [3]. The knowledge of variations in the origin of SLA, when present, may minimize the surgical complications in cases of partial laryngectomy, thyroidectomy, laryngeal transplantation and reconstructive procedures in the neck [4, 5]. Moreover, the accurate identification of the origin of SLA is essential for interventional radiologists in the context of selective intra-arterial chemotherapy for laryngeal cancer [6].

The current case report represents a rare variation of SLA with origin from ECA and suggests its possible clinical significance.

CASE REPORT

During a routine anatomical dissection of the cadaver of a 79-year-old woman at the Department of Anatomy, Histology and Embryology, Medical University – Sofia, approved by the Medico-Legal Office and Local Ethics Committee, variation in the origin of the left SLA was found. The dissection of the anterior neck region was conducted according to standard protocol. After reaching the left ECA, its branches were thoroughly cleaned of the surrounding soft tissues. It was established that the left SLA originated as a direct branch of ECA. The origin of SLA was observed approximately 1.9 cm superior to the carotid bifurcation. Moreover, the SLA had an initial horizontal then

descending course and was measured to be 2.6 cm in length. It was accompanied by the left superior laryngeal nerve, and both structures entered the larynx through the thyrohyoid membrane. There was no evidence for other anomalies or previous surgical procedures in the region of the neck. The atypical origin of the SLA is shown in Figure 1.

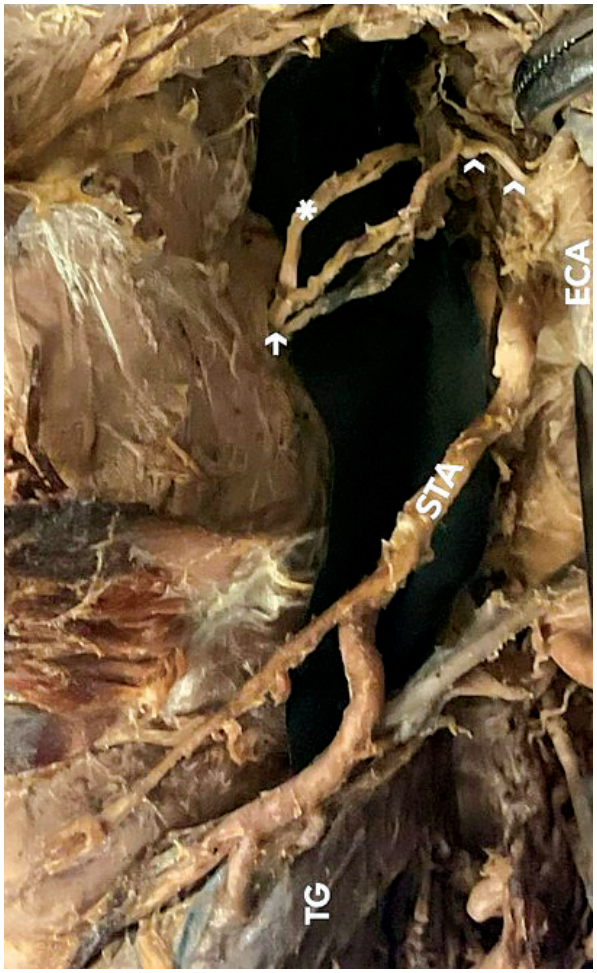

Fig. 1. Photograph of the superior laryngeal artery (SLA) with origin from the external carotid artery (ECA). STA – superior thyroid artery; TG – thyroid gland; white arrowheads – superior laryngeal artery; white asterisk – superior laryngeal nerve; white arrow – thyrohyoid membrane

DISCUSSION

The review of the literature indicates numerous variations of the origin of SLA. Vázquez et al. [7] have suggested four main variations of origin SLA – type I – SLA with origin from STA; type II – SLA arising from ECA; type III – SLA with origin from common carotid artery (CCA); type IV – SLA with origin from carotid bifurcation. Another more detailed classification for the origin of SLA includes five main variants: type I, from ECA; type II, from carotid tree; type III, from a common trunk; type IV, doubled SLA; type V, absent [8].In the present case the described origin of SLA from ECA ranges between 4% [9] and 32% [2]. Devadas et al. [10] have described SLA arising from ECA in 5% of the cases, which contrasts with the study of Rusu et al. [2]. There are relatively rarely reported variants of SLA, such as higher origin from lingual artery 1.7% to 5.4% of cases [10]; facial artery [11]. The atypical lower origins of SLA include origins from carotid bifurcation in 4% of the cases [7] or CCA in 1% [12] to 5% [7]; SLA arising from the ascending pharyngeal artery 1.7% [10]. The diversity of SLA variations also includes rare cases of SLA with origin from linguofacial trunk, as well as from a common trunk with origin from ECA, further bifurcating into SLA and inferior thyroid artery [13, 14]. Muramilanju et al. 2012 [15] described multiple variations including SLA with origin from ECA and STA with origin from the CCA. Motwani and Jhajhria, 2015 [16] demonstrated the presence of unusual common trunk arising from the anterior aspect of ECA superiorly to the carotid bifurcation. The common trunk further branched into SLA, STA, cricothyroid artery, infrahyoid and sternocleidomastoid arteries.

Knowledge of SLA variants is important in the field of laryngeal surgery and reconstructive techniques in anterior neck region. SLA is considered as a main source of blood supply of aryepiglottic fold, the anterior laryngeal wall and arytenoid region [1]. Anthony et al. [4] suggested the hypothesis that single STA is quite enough to provide sufficient revascularization of the entire larynx. However, if the SLA has a variant origin differing from STA, it may result in graft failure or necrosis.

The ligature of the ECA is a frequently used maneuver in cases of severe epistaxis or trauma [17, 18]. Usually, the ligation is performed inferiorly to the origin of the STA [19]. If the SLA originates separately from the ECA, inferiorly to the STA, standard ligation techniques might fail to control hemorrhage. Moreover, the presence of variant SLA can be confusing during the recognition of the branches of ECA. Superselective intra-arterial chemotherapy is an effective treatment for advanced laryngeal and hypopharyngeal cancer, allowing for high local drug concentrations administrated via microcatheter positioned into the STA [20]. The procedure can be compromised in case of variations of SLA, thus affecting the delivery of chemotherapeutic drugs to the target zone. For this reason, angiography is used for identification of the branching pattern of the blood vessels to the larynx [21]. The thyroidectomy or selective embolization of thyroid blood vessels may be associated with higher risk for vulnerability of aberrant SLA causing excessive hemorrhage and complications [22, 23].

CONCLUSION

The variations of the origin of SLA have important clinical significance in neck surgery. The preoperative angiographic mapping of the laryngeal vessels minimizes the potential injury of the larynx and postoperative complications.

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REFERENCES

1. Imanishi N, Kondoh T, Kishi K, Aiso S. Angiographic study of the superior laryngeal artery. Okajimas Folia Anat Jpn. 2009;86(2):61-5.
2. Rusu MC, Nimigean V, Banu MA, et al. The morphology and topography of the superior laryngeal artery. Surg Radiol Anat. 2007;29(8):653-60.
3. Andrea M. Vascularização Arterial da Laringe. Distribução Macro e Microvascular (Doctoral Thesis). Lisbon, School of Medicine, Lisbon University, 1975.
4. Anthony JP, Argenta P, Trabulsy PP, et al. The arterial anatomy of larynx transplantation: microsurgical revascularization of the larynx. Clin Anat. 1996;9(3):155-9.
5. Iimura A, Itoh M, Terayama H, et al. Anatomical study of meandering and functions of human intralaryngeal artery. Okajimas Folia Anat Jpn. 2004;81(5):85-92.
6. Nakashima T, Mihoki T, Ono T, et al. Selective (intra-arterial), rapid infusion chemo-radiotherapy to preserve the larynx in advanced laryngeal carcinoma: preliminary results. J Laryngol Otol Suppl. 2009;(31):30-4.
7. Vázquez T, Cobiella R, Maranillo E, et al. Anatomical variations of the superior thyroid and superior laryngeal arteries. Head Neck. 2009;31(8):1078-85.
8. Landzhov B, Gaydarski L, Angushev I, et al. Variations in the origin of the superior laryngeal artery and their clinical significance: a case report with a proposal for a new classification. Int J Morphol. 2022;40(3):595-600.
9. Adachi B. Das Arteriensystem der Japaner. Kyoto, Maruzen Co., 1928.
10. Devadas D, Pillay M, Sukumaran TT. Variations in the origin of superior laryngeal artery. Anat Cell Biol. 2016;49(4):254-258.
11. Bergman RA, Afifi AK, Miyauchi R. Illustrated Encyclopedia of Human Anatomic Variation. Superior Thyroid Artery. Web Site, Anatomy Atlases, 2021.
12. Quain R. The Anatomy of the Arteries of the Human Body. London, Taylor and Walton, 1844. pp.104-7.
13. Nayak SR, Krishnamurthy A, Prabhu LV, et al. Variable origin of the superior laryngeal artery and its clinical significance. Al Ameen J Med Sci. 2011;4:69–74.
14. Billakanti PB, Huban T. Anomalous origin of superior laryngeal artery from external carotid artery: a case report. Int Arch Integr Med. 2015;2:144–147.
15. Murlimanju BV, Prabhu LV, Pai MM, et al. Variant origins of arteries in the carotid triangle: a case report. Chang Gung Med J. 2012;35:281–284.
16. Motwani R, Jhajhria SK. Variant branching pattern of superior thyroid artery and its clinical relevance: a case report. J Clin Diagn Res. 2015;9:AD05–AD06.
17. Waldron J, Stafford N. Ligation of the external carotid artery for severe epistaxis. J Otolaryngol. 1992;21(4):249-51.
18. Bynoe RP, Kerwin AJ, Parker HH 3rd, et al. Maxillofacial injuries and life-threatening hemorrhage: treatment with transcatheter arterial embolization. J Trauma. 2003;55(1):74-9.
19. Wurm J, Göde U, Fucak A. Prophylaktische und notfallmässige Unterbindungen der Aa. carotides bei Patienten mit malignen Tumoren im Kopf-Hals-Gebiet [Ligature of the carotid arteries performed prophylactically or as an emergency procedure in patients with malignant tumours of the head and neck]. HNO. 2000;48(1):22-7.
20. Furusaka T, Matsuda A, Tanaka A, et al. Superselective intra-arterial chemoradiation therapy for functional laryngeal preservation in advanced squamous cell carcinoma of the glottic larynx. Acta Otolaryngol. 2013;133(6):633-40.
21. Popa RA, Popa CG, Hînganu D, Hînganu MV. Microvascularization of the Vocal Folds: Molecular Architecture, Functional Insights, and Personalized Research Perspectives. J Pers Med. 2025;15(7):293.
22. Coerts HI, D'Mello B, Verburg FA, et al. Thyroid Arterial Embolization for the Management of Benign and Malignant Thyroid Disease: A Systematic Review. Endocr Pract. 2025:S1530-891X(25)00995-4.
23. Gaydarski L, Petrova K, Dimitrova IN, et al. Unique combination of two arterial variations in the neck. A case report with a proposal for enhancement of the existing classifications. Folia Morphol (Warsz). 2025, (in press).