International Journal of Anatomy and Research,
Int J Anat Res 2018, Vol 6(3.3):5678-81. ISSN 2321-4287
DOI: https://dx.doi.org/10.16965/ijar.2018.309

Original Research Article

VARIATIONS IN THE ORIGIN OF SUPERIOR LARYNGEAL ARTERY: A CADAVERIC STUDY

M.Gayathri [1], C. Subadha *[2].

[1,*2]Assistant Professor, Department of Anatomy, Govt. Dharmapuri Medical College, Dharmapuri , Tamilnadu, India.

ABSTRACT

Background: The superior laryngeal artery (SLA) is the dominant arterial supply of the laryngeal muscles, mucosa and glands. Knowledge of variations in the origin of superior laryngeal artery will be very useful during reconstructive surgeries of the larynx, partial laryngectomy, laryngeal transplantation, and also during procedures like super-selective intra-arterial chemotherapy for laryngeal and hypolaryngeal cancers. However, relatively few studies have been done on the superior laryngeal artery in comparison to its clinical importance. The present study was aimed at documenting the prevalence of variable origin of the superior laryngeal artery within the carotid triangle.

Materials and methods: Seventy hemi-necks obtained from 35 cadavers were dissected and studied for variations in the origin of superior laryngeal artery. Dissection method was employed for this study. The infrahyoid group of muscles were identified and reflected. The sternocleidomastoid muscle and superior belly of omohyoid were displaced laterally. The fascia was removed from the lobes of the thyroid gland exposing its arteries and veins, studied the origin of STA and its branches, especially superior laryngeal artery.

Results: It was observed that the superior laryngeal artery took origin from superior thyroid in 92.8% cases. Variable origin from the bifurcation of common carotid artery was noted in 4.28% cases. SLA was found to arise from the external carotid artery in 2.85% cases. All the variations that were observed were unilateral.

Conclusion: These findings may provide further insight to the anatomists, radiologists and surgeons and can help improve performances during surgical manipulations of the larynx.

KEY WORDS: Superior laryngeal artery, Superior thyroid artery,Common carotid artery, laryngectomy, External carotid artery.

Address for Correspondence: Dr.C.Subadha, Assistant Professor, Department of Anatomy, Govt.Dharmapuri Medical College, Dharmapuri – 636701, Tamilnadu, India. Phone : 9443982393
E-Mail: subadha99@gmail.com

Access this Article online	Journal Information
Quick Response code	International Journal of Anatomy and Research
	ICV for 2016 90.30 — ISSN (E) 2321-4287 | ISSN (P) 2321-8967
	https://www.ijmhr.org/ijar.htm
	DOI-Prefix: https://dx.doi.org/10.16965/ijar
DOI: 10.16965/ijar.2018.309	Article Information
	Received: 05 Jul 2018 — Accepted: 13 Aug 2018
	Peer Review: 05 Jul 2018 — Published (O): 05 Sep 2018
	Revised: None — Published (P): 05 Sep 2018

BY-NC-SA

INTRODUCTION

Clinical condition and surgical procedures require a thorough knowledge not only of the normal gross anatomy of the structures within a region but also of common and less-common anatomical variations of the structures located within it. Recent and continuing advances in surgical procedures have made the need for such detailed knowledge ever-more important. The superior laryngeal artery is a major source of blood supply to the larynx. As per conventional textbooks of anatomy, the superior laryngeal artery (SLA) is derived from the superior thyroid artery (STA) [1]. Though variations in the origin of SLA are not very common, the variations when

present can acquire great importance in surgical procedures of the larynx like partial laryngectomy, reconstruction surgery and laryngeal transplantation [2,3]. Knowledge of SLA variations can also be helpful to clinicians for superselective intra-arterial infusion chemotheraphy for laryngeal and hypopharyngeal cancers as well as in successful radical neck dissection for minimizing postoperative complications in a bloodless surgery [4]. In the current literature, only very few studies are reported and hence the purpose of this research was to document variations in the origin of SLA in the carotid triangle.

MATERIALS AND METHODS

The study was conducted in the institute of anatomy, Madurai medical college, Madurai, Tamil nadu, with a total number of 70 sides of the neck from the 35 formalin embalmbed cadavers on both sides (35 right and 35 left). The institutional ethical clearance was obtained before the commencement of the study. Observation after dissection method was employed. The superior thyroid artery and its branches were studied by gross dissection method, which involves exposure of the artery in the carotid triangle of the neck, opening of the carotid sheath as per the instructions in the Cunningham's manual of Anatomy, tracing its origin from the external carotid artery and origin of SLA was noted(fig1). The arteries were traced up to the thyrohyoid membrane which they pierced along with internal laryngeal nerve.

RESULTS

Table 1: Variations in the origin of superior laryngeal artery.

Superior laryngeal artery	Arises from the STA	Arises from the ECA	Arises from the level of bifurcation of CCA
Right side of neck	33	1	1
Left side of neck	32	1	2
Total (70)	65	2	3
Percentage	92.80%	2.85%	4.28%

It was observed that out of the 70 hemi - necks the superior laryngeal artery took origin from superior thyroid artery in 65/70 (92.8%) fig (1) cases. In remaining cases variable origin from the bifurcation of common carotid artery was noted in 3/35(4.28%) cases (fig 2,3,4). SLA was found to arise from the external carotid artery in 2/35 (2.85%) cases (fig 5,6). All the variations that were observed were unilateral (table 1).

Fig. 1: Origin of SLA from Superior thyroid artery.

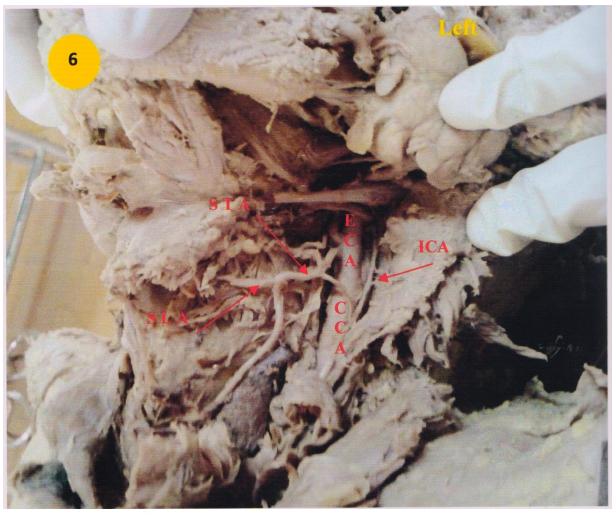


Fig. 2: Origin of SLA from CCA.

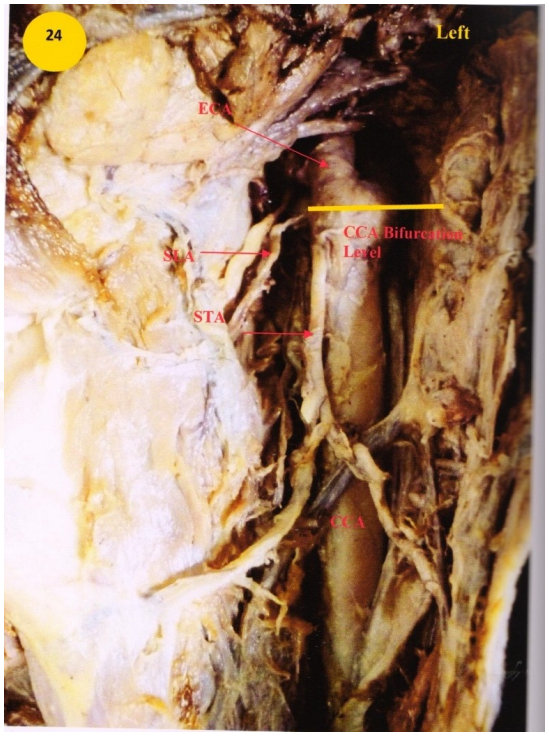


Fig. 3: Origin of SLA from the CCA.

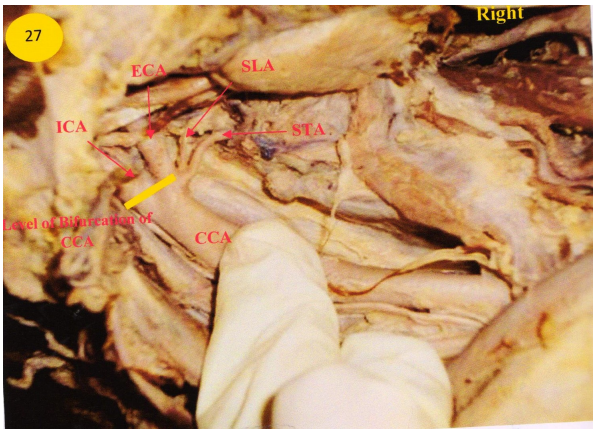


Fig. 4: Origin of SLA from the CCA.

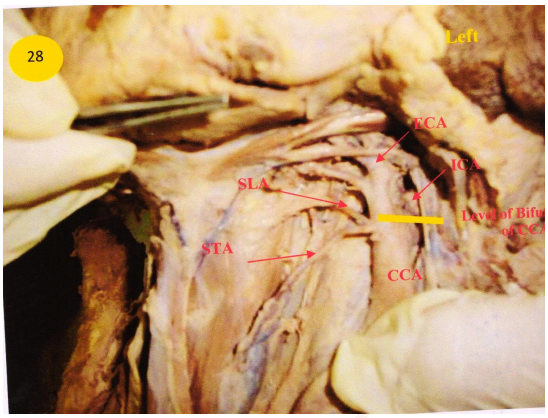


Fig. 5: Origin of SLA from the ECA.

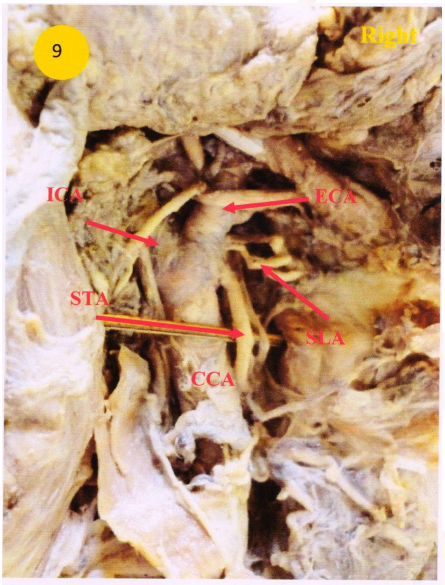


Fig. 6: Origin of SLA from the ECA.

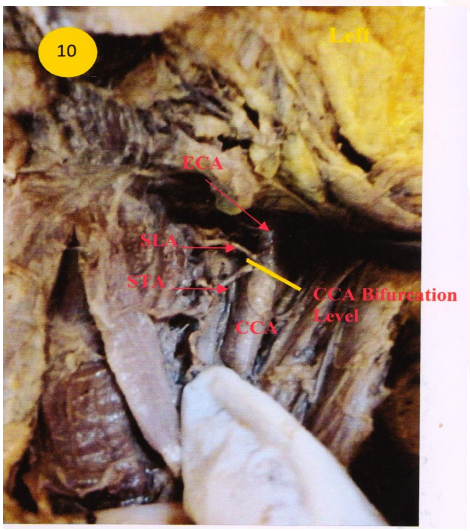
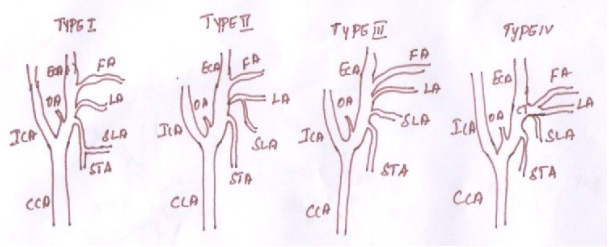


Fig. 7: Classification of origin of SLA.



DISCUSSION

The anatomy of superior laryngeal artery was examined (2011) [4] in 37 adult formalin fixed cadavers, they observed variations in the superior laryngeal artery origin and they classified it in to four types according to the observations made from their study, 1)TypeI: the SLA originated from the STA , 2) TypeII: the SLA originates from the lingual artery, 3) TypeIII: the SLA directly originates as a branch of external carotid artery, 4) TypeIV: the SLA arose from the linguo- facial trunk (fig 7). A case study (2012)[5] showed that, abnormal origin of superior thyroid artery on the left side neck of a 70 year old male cadaver and they also mentioned, the superior laryngeal artery originated as a branch of the external carotid artery instead of STA and the superior thyroid artery originated from the CCA.

Quain R (1844) [6] stated that the SLA got its origin from the external carotid artery. Adachi B (1928) [7] mentioned in their studies that superior laryngeal artery in 92% of cases arose from the STA and 4% of cases it was from the external carotid artery. Livini F (1903) [8] reported that in 72% of cases the superior laryngeal artery arose from STA and in 12% of cases it was from the external carotid artery.

In the present study shows variant origin of superior laryngeal artery in 5 specimens. Among the five specimens in 2 specimens (2.85%) the superior laryngeal artery originated from the external carotid artery and in 3 specimens (4.28%) the SLA arises from the level of bifurcation of common carotid artery.

CONCLUSION

In this study Superior laryngeal artery (SLA) was found to originate more frequently from superior thyroid artery (92.8%). Although it was also observed arising from either the external carotid (2.9%) or common carotid arteries (4.3%) . Variant origin of SLA from the carotid arterial system significantly increases the possibility of their misidentification during surgery[9]. Hence the detailed knowledge of the variant anatomy will be helpful in procedures such as partial laryngectomy, reconstructive laryngeal surgeries as well as laryngeal transplantation. Awareness

of variant anatomy can also be of use during radical neck dissection and minimising postoperative complications in a bloodless surgery. The SLA being the main artery of the larynx is used for administering chemotherapeutic drugs for treatment of laryngeal cancers, as the administered through the feeding artery directly to the tumour site can achieve a greater therapeutic effect [10]. A good and detailed knowledge of SLA will also ensure a correct decision and a safe approach prior to neuro-radiological procedures involving SLA [11].

ABBREVIATIONS

STA - Superior thyroid artery

SLA - Superior laryngeal artery

CCA - Common carotid artery

ECA - External carotid artery

Conflicts of Interests: None

REFERENCES

[1]. Standring S Gray's anatomy: the anatomical basis of clinical practice. 39th Ed. Elsevier, Churchill Livingstone, Edinburgh, London, New York, Oxford, Philadelphia, Sydney, Toronto. 2005; pp, 543-7.

[2]. Iimura A, Itoh M, Terayama H, Nakamura Y, He G, Kondo Y, Takahashi T, Shimada K, Anatomical study of meandering and functions of human intralaryngeal artery. Okajimas Folia Anat Jpn 2004;81:85-92.

[3]. Terayama N, Sanada J, Matsui O, Kobayashi S, Kawashima H, Yamashiro M, Takanaka T, Kumano T, Furukawa M, Feeding artery of laryngeal and hypopharyngeal cancers : role of the superior thyroid artery in superselective intraarterial chemotherapy. Cardiovasc intervent Radiol 2006;29:536-43.

[4]. Nayak SR, Krishnamurthy A, Prabhu LV, Potu BK, Bagoji IB, Jiji PJ, Chettiar GK, Variable origin of superior laryngeal artery and its clinical significance. Al Ameen J Med Sci 2011;4:69-74.

[5]. Muralimanju B V, Latha V prabhu, Mangala M Pai, Dhanya Jayaprakash, Vasudha V Saralaya, Varieant origin of arteries in the Carotid Triangle, A case report, Chang Gung Med J, 2012;35:281-4

[6]. Poynter C W M. Congenital anomalies of the arteries and veins of the human body with bibiliography (doctoral thesis), Vol.22.Lincon: The University Studies of the University of Nebraska; 1922, pp 1-17.

[7]. Adachi B. Das arteriensystem der Japaner. Kyoto: Maruzen Co; 1928. Pp 54-82.

[8]. Lee Mc Gregor's, Synopsis of Surgical Anatomy, 12th editions 1986.

[9]. Varquez T, Cobiella R, Maranillo E, Valderrama FJ, McHanwell S. Anatomic variations of the superior thyroid and superior laryngeal arteries. Head neck 2009;31:1078-85.

[10]. Shimizu T, Sakakura Y, Hattori T, Yamaguchi N, Kubo M, Sakakura K, Supersective intraarterial chemotherapy in combination with irradiation: preliminary report, Am J Otolaryngol 1990;11:131-6.

[11]. Rusu MC, Nimigean V, Banu MA, Cergan R, Niculescu V. The morphology and topography of the superior laryngeal artery. Surg Radiol Anat 2007;29: 53-60.

How to cite this article:

M.Gayathri,C. Subadha. VARIATIONS IN THE ORIGIN OF SUPERIOR LARYNGEAL ARTERY: A CADAVERIC STUDY. Int J Anat Res 2018;6(3.3):5678-5681. **DOI:** 10.16965/ijar.2018.309