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# A Study on the Branching Pattern of External Carotid Artery

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***Abstact:*** *Knowledge of carotid arteries is essential for surgeons and radiologists while performing the surgeries and head and neck angeograms. External and internal carotid arteries are the main arterial supply of the head and neck. Understanding variable branching patterns of External carotid arteries is highly warranted for surgeons, radiologists and various medical practitioners.present study aimed to study various types of branching patterns of External carotid artery. This study was conducted in 30 well embalmed adult cadavers during undergraduate teaching carriculum for a period of 5years. Cunningham's dissection manual was followed for dissection method. External carotid artery (ECA) was observed and branching pattern was noted. In present study variable branching patterns of ECA was observed. Among 30, Thyrolingual (TL) trunk was observed in 1 (3.33%) cadaver, Occipitopharyngeal trunk in one (3.33%) cadaver and Thyrolinguofacial (TLF) trunk in one (3.33%) cadaver were observed. Superior thyroid artery (STA) originated at the bifurcation of Common carotid artery (CCA) observed in 4 (13.33%) cases.*

*Thorough knowledge on various types of branching pattern of neck vessels is highly recommended for head and neck surgeons for better outcome of various surgeries of head and neck. This present study documented higher prevalence of Superior thyroid arteries arising from bifurcation of CCA (13.33%), while remaining variations holding almost same prevalence.*

***Key words:*** *External carotid artery, Thyrolingual trunk, Thyrolinguofacial trunk, Superior thyroid artery, Occipitopharyngeal trunk*

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## I. Introduction

Carotid arteries holds crucial role in surgeries of head and neck, which determines the outcome of any surgery. Surgeons relay on constant anatomy texts for anatomy of blood vessels. Common carotid artery (CCA) and external carotid artery are important for head and neck surgeries. The common carotid arteries differ on right and left sides with respect to their origins. On the right, it arises from brachiocephalic artery. On left side, it arises from arch of aorta; both of them extend upwards and divide into external and internal carotid arteries at the level of upper border of thyroid cartilage. Normally no branches arise from CCA in the neck region [1]. External carotid artery is one of the terminal branches of the common carotid artery. It extends from the level of upper border of the lamina of thyroid cartilage to a point behind the neck of the mandible, where it divides with in the substance of the parotid gland in to superficial temporal and maxillary arteries. At its origin the artery lies in the carotid triangle anteromedial to the internal carotid artery. External carotid artery provides all together eight branches – ascending pharyngeal artery (APA) from medial side, superior thyroid artery (STA), facial artery (FA), and lingual artery (LA) from the front, occipital artery (OA) and posterior auricular artery (PAA) from behind and two terminal branches superficial temporal artery and maxillary arteries (MA) [2]. It is not uncommon that ECA may show variability in branching pattern and additional muscular branches. These variations play major role during various surgeries and treatment modalities such as carotid stenting and endarterectomy, intra arterial infusion chemotherapy and so on [3]. Henceforth sound knowledge on these variations and incidences will reinforce the outcom of various surgeries related to head and neck and efficient diagnosis as well. The aimed to study various types of branching patterns of External carotid artery.

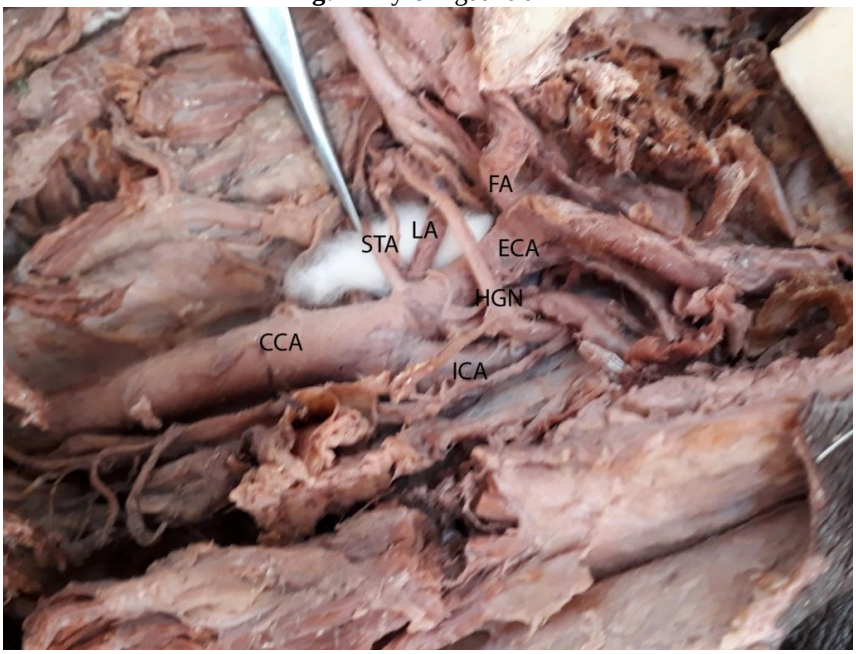
## II. Materials and Methods

Total of 30 well embalmed, formalin preserved adult cadavers were observed during dissection of head and neck region for MBBS students, for a period of 5 years. Cunningham's manual of practical Anatomy [4] was followed for meticulous dissection of ECA. Various branches and their origin from ECA were observed and variations were recorded.

## III. Results

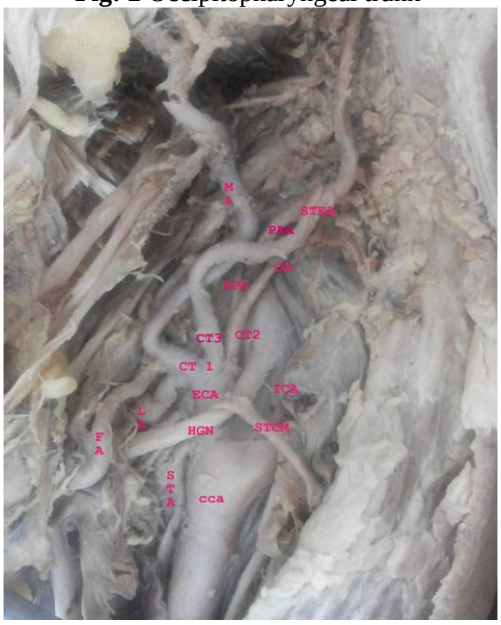
Present study conducted in 30 samples. Of which 7(23.33%) of ECA showed variations in branching pattern. Among 30 sample 1(3.33%) cadaver presented with Thyrolingual trunk (common trunk for STA and LA) on left side (Fig: 1). Occipitopharyngeal trunk was observed in 1(3.33%) cadaver (Fig: 2). Another One (3.33%) cadaver with common trunk for STA, LA and FA - the Thyrolinguofacial (TLF) trunk on left side was observed. In 4(13.33%) of 30 cadavers STA was arising at the level of bifurcation of CCA (Fig: 3).

**Fig: 1** Thyrolingual trunk



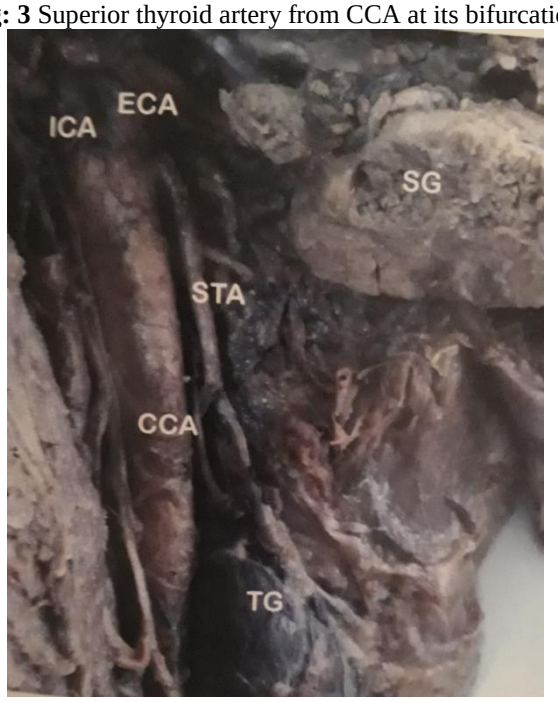

[STA: Superior thyroid artery, LA: Lingual artery, CCA: Common carotid artery, FA: Facial artery, ECA: External carotid artery, ICA: Internal carotid artery, HGN: Hypoglosal nerve]

**Fig: 2** Occipitopharyngeal trunk



STA: Superior thyroid artery, LA: Lingual artery, CCA: Common carotid artery, FA: Facial artery, ECA: External carotid artery, ICA: Internal carotid artery, HGN: Hypoglosal nerve, STCM: Sternocleidomastoid branch, CT1: Common trunk 1 for LA, FA and Maxillary artery (MA), CT2: Common trunk 2 for Occipital artery (OA) and Ascending pharyngeal artery (APA), PAA: Posterior auricular artery, STEA: Superfecial temporal artery

**Fig: 3** Superior thyroid artery from CCA at its bifurcation




CCA: Common carotid artery, STA: Superior thyroid artery, ECA: External carotid artery, ICA: Internal carotid artery, TG: Thyroid gland, SG: Submandibular gland

## IV. Discussion

External carotid artery arises from the common carotid artery and gives 8 branches to supply the head, neck and face. These branches usually arise individually, however in most of the circumstances the adjacent branches of ECA takes origin from a common trunk. Such cases holds great significance in surgeries related to head and neck such as thyroidectomy, faciomaxillary surgeries and laryngectomy so on[3,5].

Present study conducted among 30 cadavers, of which 23.3% specimens noted variations in branching pattern of ECA. Deepa Devadas et al [6] found 21.3% of cases among 80 with common trunks from which branches ECA originated. Various types of common trunks identified in the present study include Thyrolingual trunk, occipitopharyneal trunk, thyrolinguofacial trunk, and superior thyroid arteries originating from the bifurcation of CCA. Of which thyroid arteries origin from the bifurcation of CCA was the common most (13.33%) which holds 57% of all the variations.

Thyrolinguofacial trunk occurred in 3.33% in the present study; Jitender Patel et al [7] and Livini et al [8] quoted the incidence of the same at 1 and 1.5% in their studies. In line with the present findings Vishnu Gupta et al [9] found the Thyrolinguofacial trunk in 3% of his study sample (Sample size = 30). On the other hand Thyrolingual trunk and occipitopharyngeal trunks were also found at 3.33% each. Babu B P et al [10] quoted the prevalence of TLT at 0.7 – 3% after his extensive literature survey, which are in accordance with present findings. Navakalyani.T et al [11] found the TLT at 1% of her study. W.Henry Hollinshed et al [12] and Anil A et al [13] stated the prevalence of OPT at 14%, however the same occurred at 3.33% in the current study which is little far from the present findings.

**Table 1:** Comparision of present study findings with other authors

| Author | Variation | | | |
|---|---|---|---|---|
| | Thyrolinguofacial trunk (%) | Thyrolingual trunk (%) | Occipitopharyngeal trunk (%) | STA from bifurcation of CCA (%) |
| Present study | 3.33 | 3.33 | 3.33 | 13.33 |
| Jitender Patel et al [7] | 1 | - | - | - |
| Livini et al [8] | 1.5 | - | - | - |
| Vishnu Gupta et al [9 ] | 3 | - | - | - |
| Babu B P et al [10] | - | 0.7 - 3 | - | - |
| Navakalyani.T et al [11] | - | 1 | - | - |
| . W.Henry Hollinshed et al [12] | - | - | 14 | 16 |
| Anil Afitab et al [13] | - | - | 14 | - |
| Takkallapalli Anitha et al [14] | - | - | - | 19 |

4cases i.e. 13.33% of present study were Origin of superior thyroid artery from the bifurcating point of CCA. The findings of W.Henry Hollinshed et al [12] (16%) and Takkallapalli Anitha et al [14] (19%) were higher than the prevelence of present findings, which might be due to variation in sample size and ethnicity. Limitation of this present study is the lesser sample size which might be the reason for few of the variations were not occurred.

## V. Conclusion

Thorough knowledge on various types of branching pattern of neck vessels is highly recommended for head and neck surgeons for better outcome of various surgeries related to head and neck. This present study documentd higher prevalence of Superior thyroid artery arising from bifurcation of CCA (13.33%), while remaining variations holding almost same prevalence (3.33%).

## References


[1]. Standring S. Gray's Anatomy. The Anatomical basis of clinical practice.39th Ed. Edinburg. Elsevier Churchill Livingstone. 2005; 31:p.543-544.
[2]. Dutta AK (1994). Essentials of human anatomy In: Head and Neck. 2nd ed.Calcutta: Current Books International 127-132.
[3]. Xu DS, Abruzzo TA, Albuquerque FC, Dabus G, Eskandari MK, Guterman LR, Hage ZA, Hurley MC, Hanel RA, Levy EI, Nichols CW, Ringer AJ, Batjer HH, Bendok BR. External carotid artery stenting to treat patients with symptomatic ipsilateral internal carotid artery occlusion: a multicenter case series. Neurosurgery: 2010; 67:314-21.
[4]. Romanes G. J. Cunningham's Manual of Practical Anatomy. Ed 15. India: Thomson Press; 2001. 35 -43.
[5]. Al-Basheer M, Ferrar D, Nelson D, Vasudevan T. Outcome of the external carotid artery following carotid endarterectomy with added external carotid artery eversion endarterectomy. Ann Vasc Dis 2011;4:225-8.
[6]. Deepa Devadas, Minnie Pillay, Tintu Thottiyil Sukumaran. A cadaveric study on variations in branching pattern of external carotid artery. Anat Cell Biol 2018;51:225-231.
[7]. Jitendra P Patel , Rashmikant V Dave , Ritesh K Shah , Sanjay D Kanani , Ashok B Nirvan A Study Of Superior Thyroid Artery In 50 Cadavers Int J Biol Med Res. 2013; 4(1): 2875-2878.
[8]. Livini studio morfologicadelle arteria tiroidee sperm. *Arg Biel Norma Patol.* 1900;34(42):129.
[9]. Vishnu Gupta, Rakesh Agarwal. "Anomalous Branching Pattern of the External Carotid Artery in Cadavers". Int J Sci Stud. 2014;2(1):28-31.
[10]. Babu B.P. Anomalous Origin Of Thyrolingual Trunk From Right Common Carotid Artery — A Case Report. J Anat. Soc. India. 2001 50(1). 47
[11]. Navakalyani.T, Dr Janaki.V, Sumalatha. Variant Branching Patterns of External Carotid Artery –Pharyngo - Occipital Trunk & Occipito - Auricular Trunk. *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS). Volume 15, Issue 8 Ver. VI (August. 2016),44-47.*
[12]. Hollinshead HW, Rosse C. Textbook of Anatomy. 4th ed. Philadelphia: Harper & Row, 985:835-6.
[13]. Anil A, Turgut Hb, Peker T, Pelin C, Variations of the branches of the external carotid artery. *Gazi Med J*. 2000;11(2): 81-83.
[14]. Takkallapalli Anitha, Dattatray Dombe, Krishnamurthy Asha, Sanjay Kalbande. Clinically relevant variations of the superior thyroid artery: An anatomic guide for neck surgeries. Int J Pharm Biomed Sci. 2011; 2(2): 51-54.


Dr. V. Manikanta Reddy. "A Study on the Branching Pattern of External Carotid Artery". IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 18, no. 6, 2019, pp 19-22