International Journal of Medical Research and Practice

IntJMRP

http://www.intjmrp.com/

Case Report

Bilateral linguofacial trunk in a cadaver

Arpan Haldar

Department of Anatomy, ESI-PGIMSR, Joka, Kolkata

Submission: 12-07-2016 **Revision: 30-08-2016** **Publication: 30-09-2016**

INTRODUCTION

External carotid artery (ECA) irrigates large areas of head and neck being a vascular element of a great importance in surgical and radiological procedures.[1,2] It is known that ECA presents variations in the distribution in its anterior branches[3,4] finding common origins in forming trunks which can be thyro-linguo-facial truncus, thyro-lingual truncus, and linguo-facial trunks.[5] The linguo-facial trunk (LFT) has shown between 6% and 20% in analyzed cases and generally it is the most common of variations[6,7] not showing preference for one side or other.[1] These anatomical variations remain unnoticed during the life of an individual, but they become more important when there are changes associated with aging such as loss of elasticity of the trunk or aneurysms development of the trunk which are pathogenic.[8]

MATERIALS AND METHODS

During routine dissection of head and neck for undergraduate students, in a 70-year-old male cadaver in the Department of Anatomy, ESI Post Graduate Institute of Medical Sciences and Research, Joka, Kolkata, the bifurcation of the common carotid artery (CCA) was exposed as were the branches of the ECA. The dissection in the neck was performed according to the conventional technique, carefully pulling the skin, the deep cervical fascia, sternocleidomastoid muscle and separating the internal jugular vein (IJV) and vagus nerve on both sides of body. Branching pattern of the ECA were examined on both sides and variations were found which were dissected carefully and photographed (Fig. 1).

OBSERVATIONS

The branching of the CCA of both sides was normal but LFT were observed over the beginning of the superior thyroid artery on both sides. On both sides distal to carotid bifurcation the ECA and its anterior branches was located lateral to ICA and medial to IJV. ECA gave rise to the superior thyroid artery 1 cm above the bifurcation below the tip of greater cornu of hyoid bone and LFT 3 cm from the bifurcation at the level of laryngeal prominence. The LFT measured was 5 cm of length in right side and 6 cm on left side from the beginning in ECA, until its bifurcation in facial artery and lingual artery. LFT first ran forwards and medially and then divides into lingual and facial arteries, medial to internal carotid artery (ICA). The lingual artery ascended vertically

Figure 1: Linguofacial trunks in cadaver

up, crossed the IJV, laryngeal nerve taking an oblique course it passed underneath the hypoglossal nerve and anterior belly of digastric muscle to enter digastric triangle. The occipital artery arose from the posterior part of ECA opposite the origin of linguofacial trunk and coursed upwards and backwards. The ascending pharyngeal artery took origin from the medial side of ECA slightly distal to the origin of LFT from ECA travelling between it and ICA. Posterior auricular artery arose above the level of occipital artery from ECA (Figs. 2 and 3).

DISCUSSION

Variations in branching pattern in ECA were observed which more or less correlated with earlier study, but the LFT length was 7.3 cm and 9.4 cm in origin and artery bifurcation of CCA.[6] Anatomical studies have revealed the presence of LFT unilaterally in 20% of population.[1] According to a study done by Berman *et al.*[9] facial artery may replace lingual artery and supply the sublingual gland. Linguofacial trunk bilaterally in 4.8%[1] population and 28.6% population have also been reported.[10] The facial artery passed upwards and forwards and reached posterior part of submandibular gland. Mata *et al.*[11] report a LFT frequency in 19.9% case of dissections and at the same time Troupis *et al.*[6] only two cases (6%). Fazan *et al.*[1] present it most frequently 20% in the right side and 24% in left side, only two corpses (4.9%) show a bilateral LFT information that represents low level of LFT in both sides of

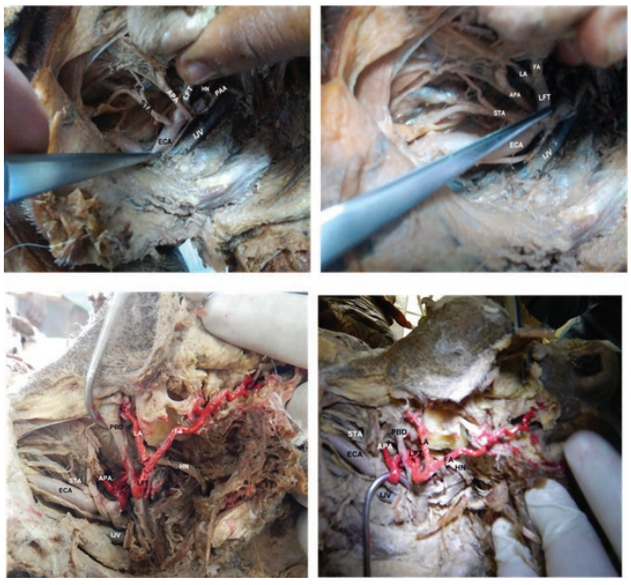

Figure 2: Linguofacial trunk on left side

Figure 3: Linguofacial trunk on right side

neck. Ahmad *et al.*[12] described that lingual and facial arteries originating from LFT had thicker in its wall and higher density of elastic fibres, which is associated according to Li *et al.*[13] to present chances developing pseudoaneurysms in ECA after catherization procedures. According to Anil[14] the lingual artery arises from a common trunk with the facial as a linguofacial trunk in 10–20% of cases. Knowledge of variations in ECA branches is very important for surgical, radiological, and diagnostic procedures and interventions in the head and neck.[3]

CONCLUSION

Knowledge of variations of ECA and its branches and their recognition during diagnostic imaging are also important for vascular surgical procedures in the region, such as carotid endoplasty for treatment of carotid stenosis[15,16] or extracranial intracranial arterial bypass for treatment of patients with occlusive cerebrovascular diseases, skull-base tumors or aneurysms.[17] Knowledge is also essential for understanding and interpretation of diagnostic angiograms as well as performing surgical procedures and vascular surgeons to prevent diagnostic errors, influence tactics and interventional procedures and avoid complications during surgery in the cervical region. Since these variations are asymptomatic, the detection will depend on imaging tests[6] for characterize the vascular anatomy and reduce the chances of collateral injury.

EMBRYOLOGICAL EXPLANATION

The development of the ECA and its branches (Fig. 4) is incompletely understood.[18] The variations might be related to changes in the transformation of the aortic arch system in the embryo.[19] The ECA is formed after a complicated process of angiogenesis.[20] It includes annexation and regression of the vessels with some remodeling. The development begins through a combination of outgrowths from some vessels, involution of others and assimilation of pre-existing channels that arise from undifferentiated precursor vessels.[18] The carotid bifurcation area and the CCA derive from the third aortic arch, while the ECA derives from the first arch with some contribution from the second aortic arch.[21] According to Larsen,[21] the trunks of the ECA arise as outgrowths from the third aortic arches. Various ventral vestiges of the first and second aortic arch arteries and ventral aorta form the ventral pharyngeal artery which later becomes the main stem of the ECA. The ventral pharyngeal artery undergoes further modifications and gives the identity of the ECA and its branches. Deviation in the normal stages of annexation and regression during angiogenesis leads to the anomalous structures (Fig. 5).[20]

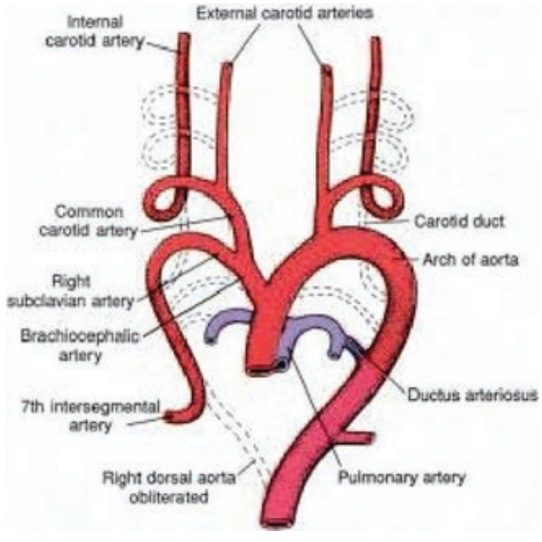

Figure 4: ECA and its branches

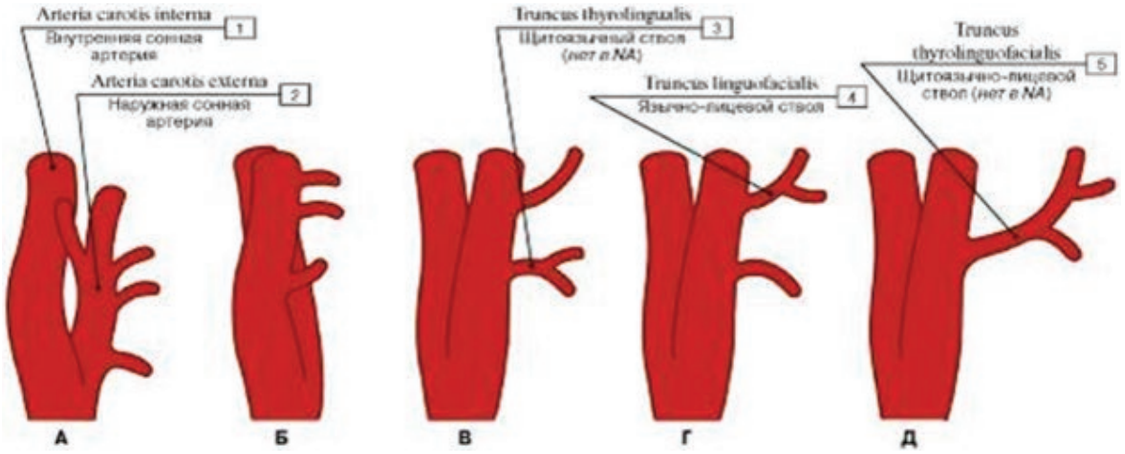

Figure 5: Different types of anomalous branching pattern of ECA

REFERENCES

1. Fazan VP, da Silva JH, Borges CT, Ribeiro RA, Caetano AG, Filho OA. An anatomical study on the linguo-facial trunk. Surg Radiol Anat 2009; 31(4):267–270.
2. Hayashi N, Hori E, Ohtani Y, Ohtani O, Kuwayama N, Endo S. Surgical anatomy of the cervical carotid artery for carotid endarterectomy. Neurol Med Chir (Tokyo) 2005;45(1):25–29.
3. Iwai T, Izumi T, Inoue T, Maegawa J, Fuwa N, Mitsudo K, et al. Thyro-linguofacial trunk arising from the common carotid artery identified by three-dimensional computed tomography angiography. Surg Radiol Anat 2012;34(1):85–88.
4. Nirmaladevi M, Sruthi G. Linguo-facial trunk – a case report. Anat Karnataka 2010;4(2):54–56.
5. Lucev N, Bobinac D, Maric I, Drescik I. Variations of the great arteries in the carotid triangle. Otolaryngol Head Neck Surg 2000;122(4):590–591.
6. Troupis TG, Dimitroulis D, Paraschos A, Michalinos A, Protogerou V, Vlasis K, et al. Lingual and facial arteries arising from the external carotid artery in a common trunk. Am Surg 2011;77(2):151–154.
7. Jadhav SD, Ambali MP, Patil RJ. Anatomical variation of the origin of the right lingual artery. Int J Anat Var 2011;4:75–76.
8. Zumre O, Salbacak A, Cicekcibasi AE, Tuncer I, Seker M. Investigation of the bifurcation level of the common carotid artery and variations of the branches of the external carotid artery in human fetuses. Am Anat 2005;187(4):361–369.
9. Bergman RA, Afifi AK, Miyauchi R. Illustrated Encyclopedia of Human Anatomic Variation: Opus II Cardiovascular system: Arteries, Head, Neck and Thorax. Common Carotid Arteries, 2013.
10. Yonenaga K, Tohnai I, Mitsudo K, Mori Y, Saijo H, Iwai T, et al.. Anatomical study of the external carotid artery and its branches for administration of superselective intra-arterial chemotherapy via the superficial temporal artery. Int J Clin Oncol 2011;16(6): 654–659.
11. Mata JR, Mata FR, Souza MC, Nishijo H, Ferreira TA. Arrangement and prevalence of branches in the external carotid artery in humans. Ital J Anat Embryol 2012;117(2):65–74.
12. Ahmad R, Al-Shaarawy S, Atteya M, Al-Fayez M, Aldahmash A, Mohal S, et al. Anatomical variations of lingual and facial arteries in male cadavers and histological study of their structure. Int J Integr Biol 2012;13(1):36–39.
13. Li SH, Hsu SW, Wang SL, Chen HC, Huang CH. Pseudoaneusym of the external carotid artery branch following radiotherapy for naso-pharyngeal carcinoma. Jpn J Clin Oncol 2007;37(4):310–313.
14. 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.
15. Brown MM, Butler P, Gibbs J, Swash M, Waterston J. Feasibility of percutaneus transluminal angioplasty for carotid artery stenosis. J Neurol Neurosurg Psychiat 1990;53:238–243.
16. Dhillon EH, Van Leeuwen MS, Fernandez MA, Eilelboom BC, Mali WPTM. CT Angiography application to the evaluation of carotid artery stenosis. Radiology 1993;189:211–219.
17. Gratzl O, Schmiedek P, Spetzler R, Steinhoff H, Marguth F. Clinical experience with extra-intracranial arterial anastomosis in 65 cases. J Neurosurg 1976;44:313–324.
18. Osborn AG, Jacobs JM. External carotid artery. In: Osborn AG, Ed. Diagnostic Cerebral Angiography. 2nd ed. Philadelphia: Lippincott Williams and Wilkins, 1999: 31–56.
19. Eid N, Ito Y, Otsuki Y. Anomalous branching pattern of external carotid artery: clinical relevance to cervicofacial surgery. Clin Anat 2011;24:953–955.
20. Mahendrakar MA. Variation in the branching pattern of external carotid artery: a case report. J Anat Soc India 2007;56:47–51.
21. Larsen WJ. Development of the vasculature. In: Human Embryology. 2nd ed. New York: Churchill Livingstone, 1997: 191–195.

Address for Correspondence:

Dr. Arpan Haldar,
Department of Anatomy, ESI-PGIMSR, Joka, Kolkata.

How to cite this article: Haldar A. Bilateral linguofacial trunk in a cadaver. IntJMRP 2016;1:pp–pp

Source of Support: None declare. **Conflict of Interest:** None.