

# Unusal course and branching pattern of external carotid artery – A case report

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## Abstract

Anatomical Variation of carotid artery system which is frequently encountered has a great impact on the surgical approaches of neck. Although many variations of the carotid arteries are well known in the literature. The type of variations reported in the present case has not been previously described. We report a unique variation of anomalous course and unusual branching pattern of right External Carotid Artery and a muscular branch to infrahyoid muscles from left lingual artery in a male cadaver aged 60 years. In the present case, on the right side short proximal part of ECA ascends upwards and medially and gave origin to superior thyroid, lingual, posterior auricular, facial and distal part of ECA. Occipital artery arises from the posterior auricular artery. The distal part of ECA ascends upward and laterally and divides into superficial temporal and maxillary artery. On left side, superior thyroid artery arises from the common carotid artery and lingual artery arises at the level of bifurcation of common carotid artery. Lingual artery gave a muscular branch to infrahyoid muscles. The embryogenesis of such anomalies is not clear, but the knowledge about variation in course and branches of External carotid artery is important for surgeons for ligation of vessels during head, neck and face surgeries and for radiologist during the interpretations of angiograms.

**Keywords:** Common Carotid, External, Lingual, Artery, Anomalous, Course, Branches.

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## INTRODUCTION

The Principal arteries of head, neck and face are two common carotid arteries (CCA). They ascend in the neck and each divides into External Carotid Artery (ECA) and Internal Carotid Artery (ICA) at the level of upper border of thyroid cartilage at the disc between C3 and C4 vertebra. ECA chiefly supplies blood to the head, neck and face region while brain is supplied mainly by ICA with contribution from vertebral arteries.<sup>1</sup> The branches of ECA may arise irregularly or may be increased or

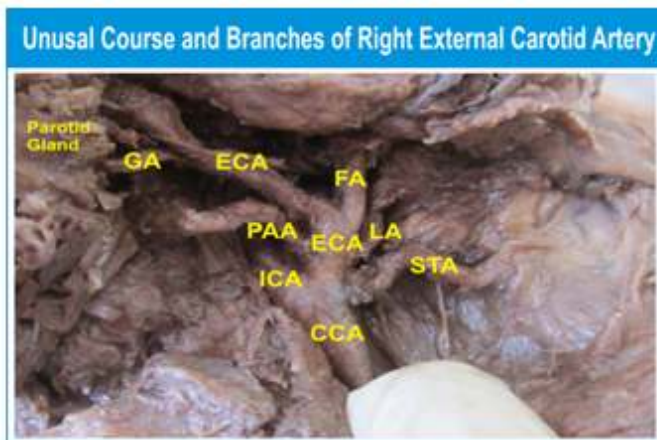
decreased in number, when increased in number (by two or more). They arise as a common stem or addition of branches not usually derived from this artery.<sup>2</sup> The knowledge of variations in the branches of ECA is must for surgeons for facio-maxillary repair and reconstructive cosmetic procedures. It is also important for oral surgeons for doing oral surgeries. Radiologist should also be aware of the knowledge of variations in the branches of ECA for better interpretation of the structures of head, neck and carotid angiograms. Therefore, it is necessary to understand the anatomy of these vessels and its variations to carry out surgeries with minimum operative and post operative complications.<sup>3</sup> The present case reports, a very rare unusual course and branching of ECA which makes the case most unique.

## CASE REPORT

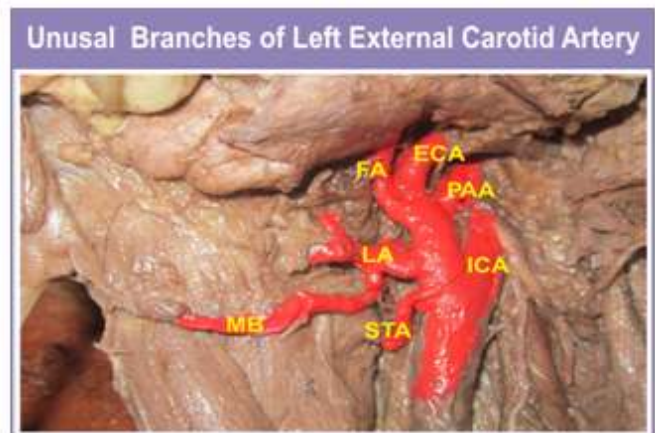
During a routine dissection of I<sup>st</sup> MBBS Batch 2013-2014 of 60 yr male cadaver, at Government Medical College, Latur. It was observed that right external carotid artery shows an unusual course and branching. On right side, CCA divides into external and internal carotid arteries 1

cm above the level of upper border of thyroid cartilage. The proximal part of ECA which is having diameter 2.5 cm and length 1.6 cm ascends upwards and medially. This proximal part of ECA at its origin, gives superior thyroid artery from its lower border, lingual artery arises from the lower border 1 mm away from STA. Loop of lingual artery is crossed by hypoglossal nerve. About 5 cm from lingual artery, facial artery arises at the angle of mandible and from the lower border of ECA. Ascending pharyngeal artery arises from posterior aspect of proximal part of ECA. Posterior auricular artery arises from the upper border of proximal part of ECA 2-3 mm away from its origin. Occipital artery arises from posterior auricular artery behind auricle. After giving facial artery at the angle of mandible, the distal part of ECA runs upward and laterally along the posterior border of ramus of mandible and enters into the parotid gland. Before

entering into the parotid gland it give glandular branch to parotid gland. Length of distal segment ECA is 3 cm diameter is 1.5 cm. The distal part of ECA divides into superficial temporal and maxillary arteries within the parotid gland. On the left side, CCA divides into ECA and ICA at the level of upper of thyroid cartilage. Superior thyroid artery arises from CCA 2 mm before its bifurcation; lingual artery arises at the level of bifurcation of CCA about 5 mm distance from its origin lingual artery gives muscular branch to infrahyoid muscles. Lingual artery proper passes deep to Hyoglossus muscle and it is crossed by hypoglossal nerve. About 5-6 mm from lingual artery facial artery arises from ECA. Posterior auricular artery arises at the level of facial artery from lateral aspect of ECA. Then ECA ascends upwards having its normal course.



**Figure 1:** Unusual course and branches of right external carotid artery.



**Figure 2:** Unusual branches of Left external carotid artery.

## DISCUSSION

Variation in the branching pattern of ECA has been reported earlier by several authors. Zumber O *et al* observed a linguo facial trunk in 20%, a thyro-lingual trunk in 2.5%, a thyrolinguo-facial trunk in 2.5% and an occipito-auricular trunk in 12.5 cases in the human fetuses studied by them.<sup>4</sup> Glunulic V *et al* has observed a right ECA, which branched directly into Superior Thyroid, Lingual, Occipital and distal part of the ECA.<sup>5</sup> The distal part give rise to right facial artery and finally bifurcated into the maxillary and superficial temporal arteries. The posterior auricular artery arises from the right occipital artery. Anu VR *et al* have found glandular branches directly given by ECA to the parotid gland<sup>6</sup>. Mamath T *et al* and Mohandas RKG found glandular branch directly given by ECA to submandibular gland<sup>7</sup>. In the present case, the distal part of right ECA bifurcated into maxillary and superficial temporal, before bifurcation, it give glandular branch to parotid gland. The proximal part

of right ECA gives all branches except occipital. On the left side, lingual artery gives a muscular branch to infrahyoid muscles. STA arises from CCA and lingual artery arises at the level of bifurcation of CCA. Such type of rare unusual course of ECA and variation in branches with direct glandular and muscular branches impart important knowledge that is especially useful for surgeries who operating on face and neck regions as well as for radiologist in the interpretation of imaging.

## CONCLUSION

Anatomical knowledge and unusual course and branching pattern of ECA will be useful in angiographic studies, trans catheter embolization procedures and in surgical procedures of the head and neck region.

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