



## ANOMALOUS BRANCHING PATTERN OF UNILATERAL EXTERNAL CAROTID ARTERY: A CASE REPORT

<b>Dr. Ankana Saha*</b>	Assistant Professor, UCMS & GTBH, Department of Anatomy, University College of Medical Sciences, Delhi-110095 . *Corresponding Author
<b>Dr. Subhadeep Saha</b>	Attending Consultant, Max Patparganj.
<b>Mrs. Divasha Chaudhury</b>	Senior Resident, UCMS & GTBH

**ABSTRACT** Variations in the branching pattern of the external carotid artery (ECA) are well known and documented. The variation in the present case was compared with those reported before. An anomalous unilateral variation in the branching pattern of the left ECA was observed in a male embalmed cadaver. In this case, the ECA gives origin of linguofacial trunk as well as direct origin of glandular branch to the submandibular salivary gland, submental salivary gland and palatine glands from the external carotid artery instead of facial artery. The embryogenesis of such a combination of anomalies is not clear, but the anatomic consequences may have important clinical implications. Anatomical knowledge of the origin, course, and branching pattern of the external carotid artery will be useful to general, head & neck, ENT and oncosurgeons when ligating the vessels during head and neck surgeries to avoid unforeseen complication in the form of bleeding by injuring the abnormal arteries. It is also important for the vascular surgeons and radiologists while performing the procedures on the arteries.

**KEYWORDS :** external carotid artery, linguofacial trunk, facial artery, glandular branch, submandibular salivary gland, submental salivary gland, palatine glands

### Introduction

Common carotid artery divides into ECA and internal carotid artery at the level of upper border of the thyroid cartilage; corresponding vertebral level is C3-C4 junction. External carotid artery (ECA) is the chief artery of head and neck region. It has eight named branches distributed to the head and neck. This bifurcation can sometimes be at a higher level.<sup>1</sup>

The branches of the ECA may arise irregularly or be diminished or increased in number. When increased in number (by two or more), they arise as a common stem, or by the addition of branches not usually derived from this artery, such as the sterno-mastoid branch of the superior thyroid or occipital artery.<sup>2</sup>

Variations in some of the branches of the external carotid are as follows: the lingual arises from a common trunk with the facial (linguofacial trunk) in 10–20% of cases; a rare combination branch of the external carotid is a thyro-linguo-facial trunk<sup>3</sup>.

Unusual branches of the facial artery have also been reported by Bergmann RA et al.<sup>3</sup>

The present case reports about variation in the branching pattern of ECA, origin of linguofacial trunk as well as direct origin of glandular branch to the submandibular gland, submental gland and palatine glands from the external carotid artery instead of facial artery.

### Case report

During routine dissection programme of first year MBBS students in the Department of Anatomy of UCMS, around 80 years male Indian cadaver, well embalmed by formalin fixation method was dissected for learning carotid division of anterior triangle of neck. The external carotid artery (ECA) and its branches of the right side were exposed. While dissecting the ECA, three unusual branches were observed. The details of the cadaver revealed the cause of death as road traffic accident. No relevant history [symptoms/ signs/radiological study] related to this vascular abnormality was there in the medical reports.

In the dissected cadaver the facial artery and lingual artery were arising together by forming the common trunk called linguofacial trunk 5 cm above the bifurcation of Common Carotid Artery (CCA) at the level of tip of the greater cornua of the hyoid bone. Just above the linguofacial trunk and before entering parotid gland the external carotid artery was giving three uncommon branches from anterior surface on the right side in carotid triangle. These three branches were direct branch to submandibular salivary gland, high submental artery and ascending palatine artery (Fig. 1)

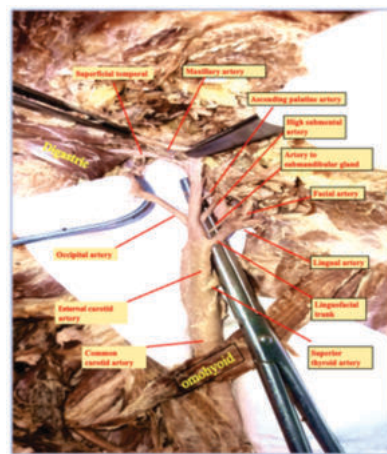
### DISCUSSION

Variations in the branching pattern of the external carotid artery have

been reported earlier by several authors. Lucev et al. conducted a study to assess the normal level of carotid bifurcation and concluded that 50% of cases the level of bifurcation at the superior border of the thyroid cartilage, 25% cases the carotid bifurcation occurred at the inferior border of the hyoid bone, 12.5% cases opposite at the level of superior border of hyoid bone and 12.5% cases bifurcation appeared at the level of inferior border of thyroid cartilage.<sup>4</sup> Sanjeev et al. have found the higher division of CCA (16.22%) & Lower division of CCA (27.02% cases).<sup>5</sup> In a case report by Nayak S, facial artery originated as high as in the parotid.<sup>6</sup>

Zumre O et al conducted a study on the distribution of external carotid artery trunks in human foetuses showed a linguofacial trunk in 20%, thyrolingual trunk in 2.5% and a thyrolinguofacial trunk in 2.5% of the cases.<sup>7</sup> In the present study linguofacial trunk is a finding similar to Zumre O et al. Mohandas RKG et al. report about a similar case of direct glandular branches from the ECA to the submandibular gland.<sup>8</sup> Li L et al. reveal that branches to submandibular gland could also be derived from external carotid artery.<sup>9</sup> Last two studies revealed direct glandular branch from ECA are similar to our present study.

The awareness of direct glandular branch to the submandibular gland from the external carotid artery may prove to be of paramount importance for surgeons while performing submandibulectomy.



**Figure 1-** Lateral View Of Neck Showing Three Unusual Branches Giving From External Carotid Artery

### CONCLUSION

Anatomical knowledge of variations in the branching pattern of ECA

will be useful for the procedures like diagnostic carotid angiograms, carotid catheterization, transcatheter embolization, reconstruction of aneurysms, carotid endoplasty, carotid endarterectomies and in surgical procedures of the head and neck region. Course of the normal and variant facial artery is important in surgeries involving facial flaps. Surgeons should aware of these abnormal branching of ECA while performing radical neck dissections, thyroidectomy, laryngectomy, glossectomy and ligation of ECA during uncontrollable epistaxis. We the anatomists feel proud to add the additional information to the existing knowledge in the text books which helps surgeons mainly.

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