



An unusual branching pattern of common and external carotid artery in a human cadaver: a case report

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CASE STUDY

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Abstract

During a routine dissection in the Department of Anatomy of the Rural Medical College, Loni, we found a rare variation in branching pattern of the common carotid artery (CCA) and external carotid artery (ECA) bilaterally. The knowledge of possible anatomical variations of CCA and ECA are especially important in the surgeries of head, neck and face; and also for the radiologist to understand and interpret carotid system imaging when undertaking cerebral angiography. This case and the clinical significance of this variation are reported in this paper.

Key Words

Common carotid artery, external carotid artery, superior thyroid artery, linguo-facial trunk, ascending pharyngeal artery, occipital artery

Introduction

The anatomy of the carotid arteries is of special interest to surgeons involved in the management of head and neck pathology. The presence of any anomalous origin and/or course of vessels is usually discovered as an incidental finding when imaging studies are performed during investigations of

relevant clinical conditions. Variations of the CCA and ECA) may be asymptomatic, thus care must be exercised during routine surgeries of head, neck, face and throat. It is particularly important for surgeons to differentiate between the ECA and internal carotid artery (ICA) to prevent erroneous ligation of the ICA leading to hemiparesis.

Case Report

We report a variation involving the CCA and ECA bilaterally, which was discovered during dissection of the head and neck region of a 72-year-old male cadaver. We are using donated and unclaimed dead bodies for the purpose of medical education and research including anatomical examination under the Bombay Anatomical Act, 1949. The cause of death could not be ascertained as is the case with most of such bodies obtained for the above stated purposes.

The variations included; a relatively high division of CCA on both sides at 1cm above the greater cornu of hyoid bone (Figure 1). The superior thyroid artery originated from CCA on both sides just above the level of greater cornu of hyoid bone. After that the CCA showed simultaneous branching into common linguofacial trunk, occipital artery, ascending pharyngeal artery, ECA and ICA on both sides.

The linguofacial trunk originated from the anterior aspect of CCA and coursed towards the mandible for 1cm and divided into lingual and facial arteries. The occipital artery arose opposite to the linguofacial trunk and coursed upwards and backwards (Figure 1). The ECA originated between the linguofacial trunk and the occipital artery and coursed upwards for about 3cm and gave rise to posterior auricular artery from its posterior aspect (Figures 2 & 3) and then coursed upwards towards the neck of mandible and finally bifurcated into maxillary and superficial temporal artery. The ICA originated from CCA along with the above mentioned branches and coursed behind the occipital artery. The ascending pharyngeal artery arose from the medial surface of CCA (Figure 1).

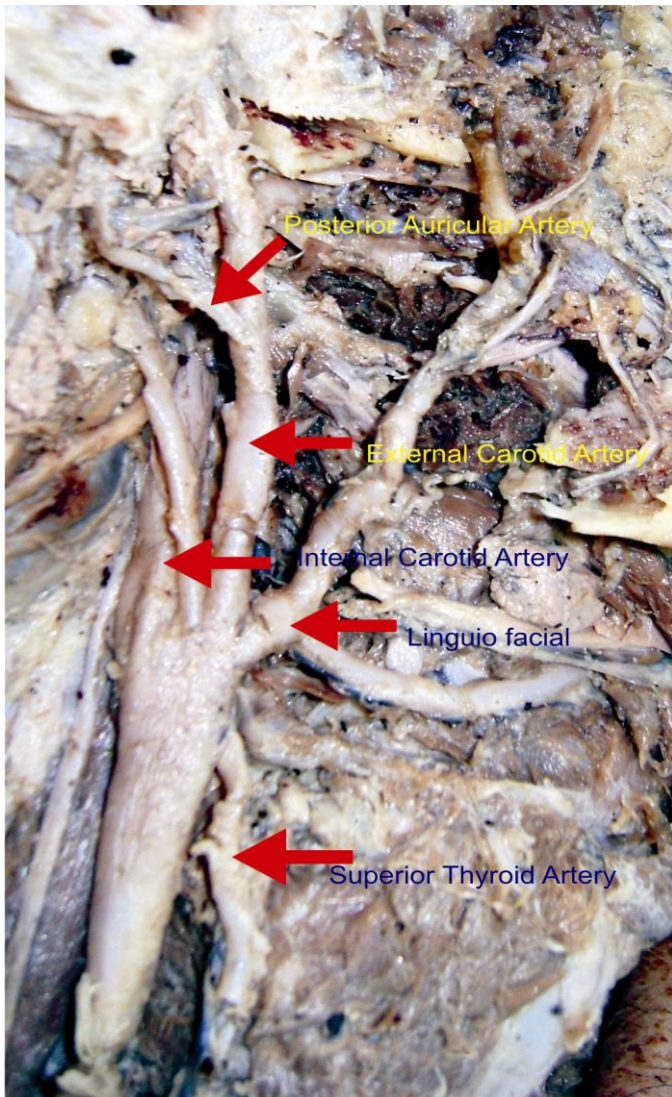


Figure 1: Photograph shows high origin of superior thyroid artery and simultaneous branching of the CCA into the linguofacial trunk, ECA, occipital, ICA.

Discussion

The CCA and its branches provide the major source of blood to the head and neck. The CCA bifurcates into ECA and ICA at the upper border of thyroid cartilage^{1,2}. Bifurcation as high as the hyoid bone have been reported before. Gluncic and colleagues³ and Thwin and colleagues⁴ reported the bifurcation of CCA at the level of the 2nd cervical vertebra (hyoid bone). In this case a relatively high bifurcation of the CCA was found at about 1cm above the level of hyoid bone on both sides which has not been reported previously. The superior thyroid artery, lingual artery and facial artery arise from the ventral aspect near the origin of the ECA. The ascending pharyngeal, occipital and posterior auricular branches arise from the dorsal side of the ECA². In the presented case the CCA divided simultaneously into the linguofacial trunk, ECA, ICA, and occipital artery after giving the superior thyroid artery. Hollinshead mentioned that the origin of the superior thyroid artery from the CCA is not uncommon and it is found in 45% of cases⁶.

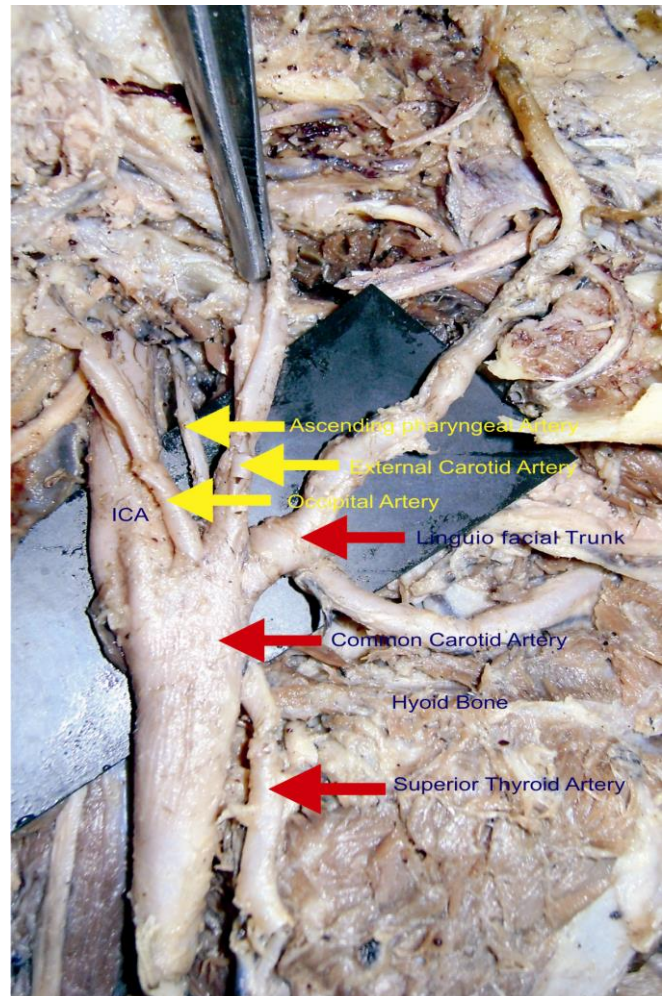


Figure 2: Photograph shows posterior auricular artery arising from ECA.

Zumre and colleagues in their study on human fetuses found a linguofacial trunk in 20%, a thyro-lingual trunk in 2.5%, and a thyro-linguo-facial trunk in 2.5% of the human fetuses studied⁷. In our case a similar linguofacial trunk was seen bilaterally. The occipital artery arose separately from the posterior aspect of the CCA, such variation has not been reported earlier. Sinnatamby and Standing mentioned that the ascending pharyngeal artery arises from the deep surface of the ECA^{8,1}, while according to Hollinshead, in 14% of individuals the ascending pharyngeal artery arises from the occipital artery⁶. In this case the artery arose from the medial surface of the CCA at the level of its division into various branches such variation has not been mentioned earlier.

The variation occurred due to abnormal development of the ECA system. It is a complicated process of angiogenesis and remodelling which includes annexation and regression of vessels. The variant will result from deviation in this process. We mentioned that this is a rare variation, but that does not mean that such type of variation could not be encountered in the future. It may be seen in cadavers or living human beings during operation. Therefore surgeons and radiologists should be aware of it and hence it needs to be reported. At present we have not found any literature that documents the

clinical significance of such variations apart from the risk of error during surgery of the head and neck region.

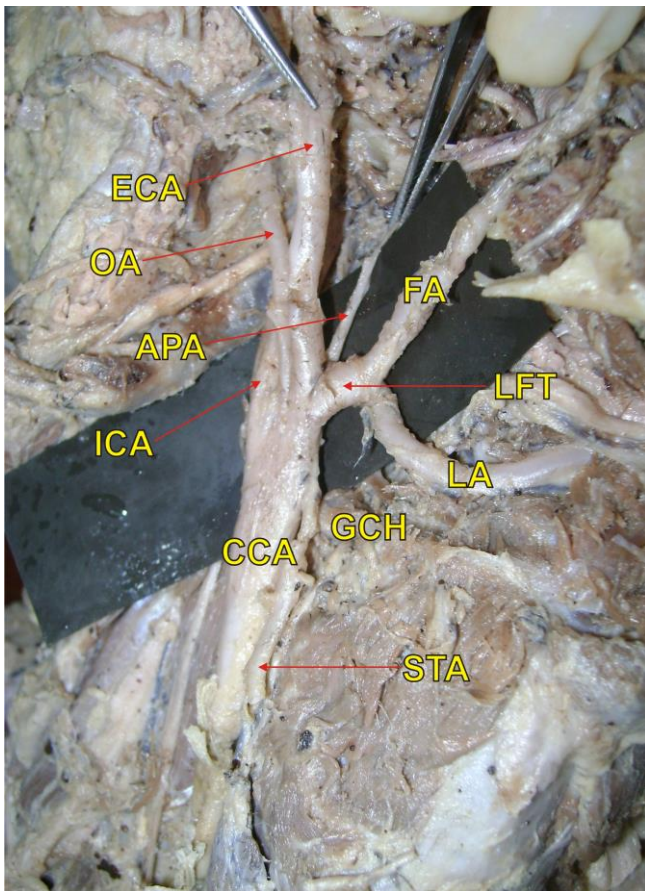


Figure 3: ECA: External Carotid Artery; OA: Occipital Artery; APA: Ascending Pharyngeal Artery; ICA: Internal Carotid Artery; LFT: Lingo facial Trunk; CCA: Common carotid Artery; GCH: Great Cornu of Hyoid; STA: Superior Thyroid Artery; FA: Facial Artery.

Conclusion

The presented study highlights a variation in the branching pattern of the CCA and ECA. These findings may gainfully be utilised by surgeons who operate on the head, neck, face and throat and also by radiologists to avoid possible errors in reporting of radio-images.

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CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

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