

Variations in Branching Pattern of External Carotid Artery

Naveen Kumar S.¹, Naveen Kumar K.²

Abstract

Common Carotid arteries (CCA) provides major sources of blood to head and neck by giving two terminal branches, external and internal carotid arteries, at the level of superior border of thyroid cartilage in carotid triangle. During routine dissection in Department of Anatomy, Shadan institute of Medical Sciences, Dr VRK Womens Medical college and we observed variations in three specimens. In one specimen we observed a higher division of External Carotid artery (ECA), near to the angle of mandible and in two specimens, we observed linguofacial trunk bilaterally. Knowledge of such variations are important for surgeries during plastic and reconstructive surgeries of head, neck and face to avoid iatrogenic injuries and for radiologists for interruption of angiograms of face and neck regions.

Keywords: Common Carotid Artery; External Carotid Artery; Anatomical Variation.

Introduction

The common carotid arteries (CCA) provide the major source of blood to the head and neck. Normally it gives two terminal branches, external (ECA) and internal carotid arteries (ICA) at the level of superior border of thyroid cartilage in carotid triangle [1]. External carotid artery extends from the level of upper border of lamina of thyroid cartilage to a point behind neck of mandible [2].

Branches of ECA develop centripetally starting from arterial network of that territory and the preferred routes are formed in accordance with the local hemodynamic need, may result in various types of variation in branching pattern of ECA [3].

The knowledge of carotid arterial system is useful to minimise the post operative complications in

bloodless surgical field. The variations in branching pattern of ECA are important for surgeons during plastic and reconstructive surgeries of head, neck and face to avoid iatrogenic injuries and it is also important for radiologists for interpretation of angiograms of face and neck regions [4].

Materials & Methods

Specimen chosen for dissection are the 40 cadavers kept for dissection for I MBBS students from 2014-2017. Anomalous, tortuous and dilated CCA were discarded for the study. All specimens were well preserved in formalin and dissected according to Cunningham's manual. Variations were well documented.

Observations & Results

Eighty specimens were evaluated for this study. Table 1 shows variations in origin of ECA.

We observed normal branching pattern of ECA in 16 specimen. In one specimen, we observed a higher division of ECA, division occurred near to angle of mandible and also showed linguofacial trunk which later divided in to lingual and facial arteries. We

Author's Affiliation: ¹Associate Professor, Department of Anatomy ²Associate Professor, Department of ENT, Shadan Institute of Medical Sciences and Research Centre, Hyderabad, Telangana 500008, India.

Corresponding Author: Naveen Kumar S., Associate Professor, Department of Anatomy, Shadan Institute of Medical Sciences and Research Centre Hyderabad, Telangana 500008, India.

E-mail: drsnaveen@gmail.com

Received | 08.08.2018, **Accepted |** 31.08.2018

Table 1:

Level of origin	Right	Left	Total percent
At the angle of mandible.	06 (7.5%)	03 (3.75%)	5.62%
At hyoid bone	12 (15%)	09 (11.25%)	13.12%
Upper border of thyroid cartilage	19 (23.75%)	15 (18.75%)	21.25%

observed linguo facial trunks in 2 cadavers which were bilaterally present.

In another specimen, we observed superior thyroid artery arising from CCA and also a linguo facial trunk.

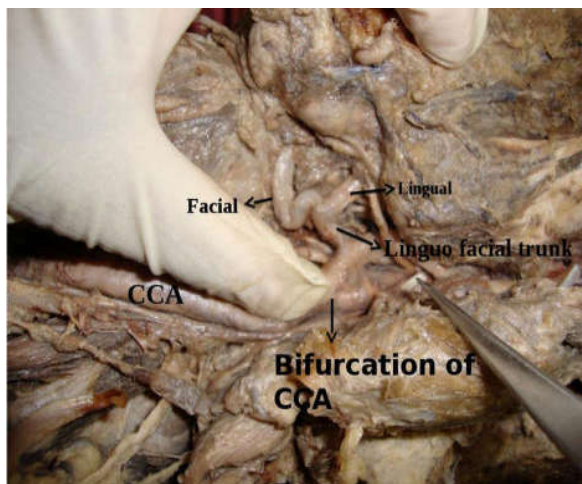


Fig. 1:

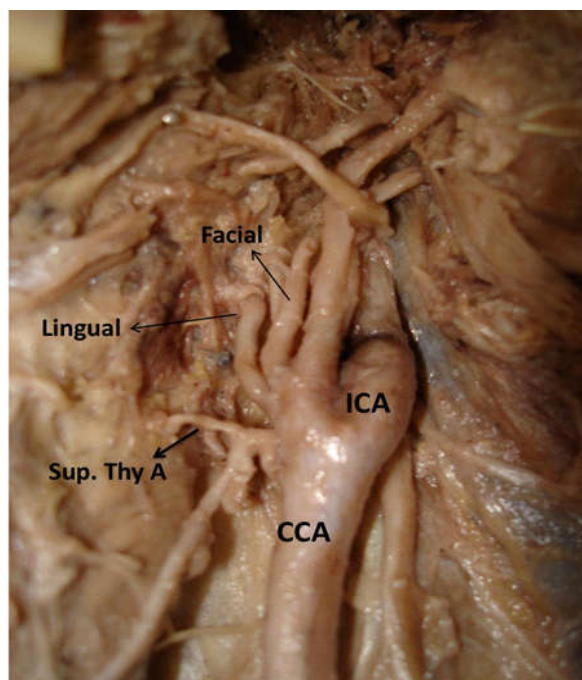


Fig. 2:

Discussion

The ECA is one of the terminal branches of CCA usually given off at the level of the upper border of thyroid cartilage, corresponding to C3-C4 vertebral level 12. It is anteromedial to the internal carotid artery at its origin in the carotid triangle and ascends to the parotid gland and terminates into maxillary and superficial temporal arteries at the level of the neck of the mandible. It gives off superior thyroid, lingual, facial, ascending pharyngeal, occipital and posterior auricular arteries in the neck. In a radiological study in different age groups, it is reported that the origin of ECA can be anywhere between C2-C6 vertebral level (From last article in the folder). According to Inamasu & Guiot, CCA bifurcation may be an individual variation which may occur due to differences in level of embryological origin of ECA.

Thwin et al reported a higher bifurcation at the level of hyoid bone [5]. Kishve et al reported a higher level of origin where ECA originated about 1cm above hyoid bone [6]. In this study, we observed a still higher level of bifurcation, near to the level of angle of mandible.

Sanjeev et al observed that superior thyroid artery is a direct branch of CCA in 35.14% of cases. According to Al- Rafiah et al, superior thyroid artery branched from CCA in 18.3% of cases [7]. In this study, we observed origin of superior thyroid artery from CCA in one specimen.

Sanjeev et al. found linguo facial trunk in 18.92% of cases. Ozgur et al observed linguo facial trunk in 7.5% of cases. In the present study, we observed linguo facial trunk in 2 specimens unilaterally. In one specimen with linguo facial trunk, we observed superior thyroid artery coming from CCA.

Conclusion

The branches of the external carotid artery are the key landmarks for adequate exposure and appropriate placement of cross clamp on carotid arteries. Knowledge of variations in branching pattern and its position is mandatory to avoid

complications during various surgical procedures for ENT surgeons and radiologists for interpreting radiographs.

References

1. Susan Standring, Vascular supply and lymphatic drainage. *Gray's Anatomy - The Anatomical basis of clinical practice*, 40th Ed, Philadelphia: Elsevier Churchill Livingstone; 2008.p.444.
2. A.K.Datta, Great blood vessels of the Neck. *Essentials of Human Anatomy (Part -II)*, 3rd Ed, Kolkata: Current books International; 2007.p.117.
3. Khanal L, Baral P, Yadav P, Pandeya A, Shah S, Koirala S. Bilateral Anatomic Variation in branching pattern of External Carotid artery in a male cadaver. *J.Morphol.Sci*, 2015;32:108-110.
4. Surekha D. Jadhav, Manoj P. Ambali, Rao Saheb J. Patil. Anatomical Variation of the origin of right lingual artery. *International Journal Of Anatomical variations*, 2011;4:75-78.
5. Thwin SS, Soe MM, Myint MM, Than M, Lwin S. Variations of the origin and branches of the external carotid artery in human cadavers. *Singapore Med.J*, 2010;51(2):e40-e42.
6. Prajakta S. Kishve, Sanjay P. Kishve, Mohini Joshi, Syed MM Aarif, Piyush Kalakoti. An unusual branching pattern of common and of external carotid artery in a human cadaver. *Australasian Medical Journal AMJ*, 2011;4(4):180-82.
7. Sanjeev IK, Anita H, Ashwini M, Mahesh U, Rairam GB. Branching pattern of External carotid artery in human cadavers. *J.Clin. Diagn Res*, 2010;4:3128-33.
8. Ozgur Z, Govsa F, Ozgrs T. Assessment of origin of characteristics of the front branches of ECA. *J Cranio Fac Surgery*, 2008;19:1159-1166.
9. Vishnu Gupta, Rakesh Agarwal. Anomalous branching pattern of the external carotid artery in cadavers. *International journal of scientific study*, 2014;2:28-31.