Anomalous Branching Pattern of the External Carotid Artery in Cadavers

Vishnu Gupta¹, Rakesh Agarwal²

¹Professor & MS in the Department of Anatomy MMC, Muzaffarnagar UP, India,
²Post-Graduate Student in the Department of Anatomy MMC, Muzaffarnagar UP, India

Corresponding Author: Dr. Vishnu Gupta, Professor Department of Anatomy MMC, Muzaffarnagar UP, India. Phone: 9412617346. E-mail: Vishnu.gupta007@yahoo.com

Abstract

Background: With increasing use of invasive diagnostic and interventional procedures in cardio-vascular disease, it is important to find out type and frequencies of vascular variations. Variations in the course, branching and distribution of carotid arteries are commonly encountered.

Material & Method: In the present study we have observed variations of the branching pattern of external carotid artery. We examined the 30 cadavers during routine dissection.

Result: One cadaver had common trunk of lingual, facial and superior thyroid artery on one side (i.e thyrolinguofacial trunk) and in four cadavers there were unilateral common trunk of lingual and facial artery i.e linguo facial trunk.

Conclusion: Anatomical knowledge of the origin, course and branching pattern of external carotid artery will be useful during head & neck surgeries. The present study thus provides useful information for clinical application. The clinical importance of this variation is discussed.

Keywords: External carotid artery, Lingualfacial trunk, Thyrolinguofacial trunk

INTRODUCTION

External carotid artery is the chief artery of Head & Neck region in humans. It arises from the common carotid artery, lateral to the upper border of the thyroid cartilage, level with intervertebral disc between the third and forth cervical vertebrae. From its origin it take a slightly curved course, passes upward and forward, and then inclines backward to the space behind the neck of the mandible, where it divides into the superficial temporal artery and maxillary artery within the parotid gland. It is decreases in size in its course up to the neck, owing to the number and large size of the branches extending from it. It has eight named branches distributed to the head & neck.¹ The facial artery normally arises from external carotid artery, just above the lingual artery, at the level of greater cornu of hyoid bone in the carotid triangle. The reported variation of facial artery includes its intraparotid origin,² origin as a common trunk with lingual artery as linguofacial trunk.³⁴ Another variation in branches of external carotid artery are as follows – the lingual artery form a common trunk with the facial (lingo facial trunk) in 10-20 % cases, a rare combination branch of the external carotid artery is a thyrolinguofacial trunk,⁵ also reported about the presence of linguofacial trunk, thyrolingular trunk, thyrolinguofacial trunk in human fetus.⁶ In the surgical literature, Catell, Phillips and Gorskie⁷ had discussed the danger of injury atypically originating large cervical arteries during operation on thyroid gland.

These variations can pose a dangerous situation during surgeries like thyroidecotomy, laryngetcotomy and other neck surgeries, preoperative selective arterial angiograms, in management of head neck tumors. So it is important for surgeons, radiologist to be aware of the variations among these arteries. Surgeons should be able to differentiate between the facial and lingual artery to insure accurate arterial ligation during oral and maxillofacial surgery and radical neck dissection. This knowledge can also help radiologist to understand and interpreted carotid system imaging.⁸ The present study was undertaken to know the anatomy of the variation in the branching pattern of external carotid artery as-common liguo facial trunk and rare variation thyro-linguo facial trunk.
MATERIAL AND METHOD

Thirty properly embalmed (sixty sides), formalin preserved cadavers were selected for the study. The present study was carried out during 2006 to 2013 in the department of Anatomy, Muzaffarnagar Medical College, Muzaffarnagar (U.P). This dissection of head and neck carried out according to the instruction by Cunningham’s manual of practical anatomy (Vol.3, 15th editions, 130-135). The dissection took place during the year 2006 to 2013. The meticulous dissection of external carotid artery was carried out in the carotid triangle and infratemporal fossa, clearly delineating its origin and all the branches.

RESULT AND OBSERVATIONS

During routine dissection for undergraduate students in the Department of Anatomy, MMC, Muzaffarnagar an unusual branching pattern of external carotid artery was observed in cadavers. Variations in the origin, facial, lingual and superior thyroid artery from the external carotid artery on both sides was observed in cadavers. In present study we recorded one of thyrolingual facial trunk (common origin of superior thyroid, lingual artery and facial artery arises from anterior surface of external carotid artery on left side i.e. 3.3%) (Figure 1). The lingual and facial artery were originating in two cadaver right side and in two cadaver left side i.e. 11.3% as the common lingual facial trunk from the anterior side of external carotid artery, above the carotid bifurcation (Figures 2 and 3). The facial lingual artery trunk was running medially and upwards, which was crossed by hypoglossal nerve.

DISCUSSION

The location of carotid bifurcation, the branching pattern of external carotid artery and variations of the branch origins are known quite well. The branches of external carotid artery may arise irregularly or alter in number. When increase in number (by two or more), they arises as common stem, or by addition of branches not usually derived from this artery, such as sternomastoid branch of superior thyroid or occipital artery.

There are reports in literature of origin of lingual artery from common carotid artery, lingual facial trunk or thyrolingual facial trunk from external carotid artery. In present study one such case of thyrolingual facial trunk was found which originated from anterior surface of external carotid artery (Figure 1) unusual case of origin of superior thyroid, lingual was also described by Arthur Thomson in his notes an Unusual variation Budhiraja and Rastogi reported variable origin of thyrolingual trunk from right and left common carotid artery respectively Ozur et. al. classified the origin of these arteries which were arises from the external carotid artery in four types and reported their incidences. The separate origins of the arteries were defined type 1 (in 90% of the cases), the lingual facial trunk as type 2 (7.5%), thyrolingual trunk as a type 3 (2.5%) and thyrolingual facial trunk as type 4. Livini observed the origin of superior thyroid artery in common with facial and lingual artery in 1.5% of cadavers. The Thyrolingual trunk was found in 3.5% of cases by Shintani, in 2% of cases by Gaillard and Md Banna. In present study we recorded one case of the common thyrolingual facial trunk i.e. 3.3% of cases arises from anterior surface of external carotid artery.
The branches of the external carotid artery are the key landmarks for adequate dissection on the carotid arteries and should be identified before cross clamps are placed and an arteriotomy is performed. So awareness of details and topographic anatomy of variations of the external carotid artery may be useful for both radiologists and vascular surgeons to prevent diagnostic error.

**REFERENCES**


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