Facial Artery and Lingual Artery Originating from a Common Trunk (Faciolingual Trunk)

ORTAK KÖKTEN ORJİN ALAN ARTERIA FACIALIS VE ARTERIA LINGUALIS (TRUNCUS FACIOLINGUINALIS)

K.İpek ERGÜR , Çiğdem İÇKE

Dokuz Eylül Universitesi Tıp Fakültesi, Anatomi Anabilim Dalı

ÖZET

Amaç: Bu çalışmanın amacı disseksiyonlar sırasında gözlenen truncus faciolinguali's'in farklı tiplerinin ve önemli anatomik yapılara göre yerleşimlerinin tanımlanmasıdır.

Gereç ve yöntem: Dokuz Eylül Üniversitesi Tıp Fakültesi Anatomi Anabilim Dalı'nda yapılan disseksiyonlar sırasında formalin ile fikse edilmiş 14 yetişkin insan kadavrasında arteria carotis externa'dan ortak orjin alan 4 adet olgu gözlendi. Bu olgularda truncus faciolingualis tiplendirildi ve lineer ölçümlerle komşu yapılarla olan ilişkileri tanımlandı.

Bulgular: Tüm olguların %85,7'sinde tip I olarak adlandırılan ortak bir trunkus olmadığı, %3,6'sında tip II olarak adlandırılan kısa, %10,7'sinde ise tip III olarak adlandırılan uzun ortak bir kök bulunduğu gözlendi. Çalışmamızda tip III olguların truncus faciolingualis'in uzunluğu min: 6,2 mm ve max: 9,6 mm olarak ölçüldü.

Sonuç: Arteria carotis externa'nın dallanma varyasyonlarını değerlendiren çalışmamız, boyun bölgesine cerrahi yaklaşımlarda, kemoterapatik ajan uygulamalarında ve radyolojik tanılamada klinisyenlere yardımcı olabilir.

Anahtar sözcükler: Arteria carotis externa, arteria facialis, arteria lingualis, truncus faciolingualis, varyasyonlar

SUMMARY

Objective: The objective of this study is to describe the different types of faciolingual trunks observed during our dissections, and define their localizations according to anatomic landmarks.

Material and method: In Anatomy Department of Dokuz Eylul University Medical Faculty, it was observed that the facial and lingual arteries originated from the external carotid artery with a common origin (faciolingual trunk) in 4 cases during the dissection course of 28 formalin fixed adult human cadavers. In the cases with faciolingual trunk, the common trunk was typed and its relations with adjacent structures were determined with lineer measurements.

Results: In 85.7 % of all cases type I was observed which has no common trunk, in 3.6 % type II with short common trunk and in 10.7 % type III with long common trunk. In our cases of type III, the common trunk length was measured as minimum: 6.2 mm and maximum: 9.6 mm.

Conclusion: In our study, evaluating the branching variations of the external carotid artery may be helpful to clinicians during the surgical approaches of the neck region, chemotherapeutic agent applications and radiologic diagnosis.

Key words: External carotid artery, facial artery, lingual artery, faciolingual trunk, variations

K. Ipek ERGUR
Dokuz Eylül Universitesi
Tıp Fakültesi
Anatomi AD
35340 Inciralu, İZMİR
Tel: (232) 4124359
Faks: (232) 2590541
e-posta: ipek.ergur@deu.edu.tr

The ventral branches of the external carotid artery (ECA) are the superior thyroid artery (STA), facial artery (FA) and lingual artery (LA). At the level of the great horn (GH) of hyoid bone, the LA originates from the ECA between of its branches STA and FA (1-3). It is the main artery supplying of the tongue and the floor of the oral cavity. In the carotid triangle the FA is originated from the ECA above the level of the LA; it gives branches supplying the face and neck regions (1,2,4-6).

In the review of the literature, the cases with the facioligual trunk (FLT) originating from the ECA were observed rarely (7-10). The aim of this study was to describe the different types of the cases with the FLT and define their localizations according to anatomic landmarks.

MATERIAL AND METHOD

In Anatomy Department of Dokuz Eylul University Medical Faculty, 14 formalin fixed adult human cadavers were dissected bilaterally. In 4 cases, it was observed that the facial and lingual arteries originated from the external carotid artery with a common trunk.

In our study, AF and AL originated separately from ACE in Type I cases. In Type II FLT cases, a short FLT originates from ACE's medial side and then branch into AF and AL. In Type III FLT cases a large FLT originates from the medial wall of ACE and then branch into AF and AL.

For each of the cases the localization of the FLT was described with linear measurements according to the horizontal planes passing from the determined anatomic landmarks; the type of the FLT was defined; its diameter and length were measured. For the measurements 0.1 mm sensitive compass was used.

The anatomic landmarks used in this study were the carotid bifurcation (CB), the point that the internal branch of the superior laryngeal nerve (IBSLN) perforating the thyrohyoid membrane (TM) and the posteroinferior tip of the GH.

RESULTS

In our study the origin variations of the FA and LA were described as three types; the cases without FLT, with short FLT or with long FLT were defined as Type I, Type II and Type III respectively. The frequency rates of the types in our dissections were; 85.7 % (n=24) for the Type I (Fig 1), 3.6 % (n=1) for the Type II (Fig 2) and 10.7% (n=3) for the Type III (Fig 3). The FLT type, diameter, length, its distance to determined anatomic landmarks are presented in the Table I.

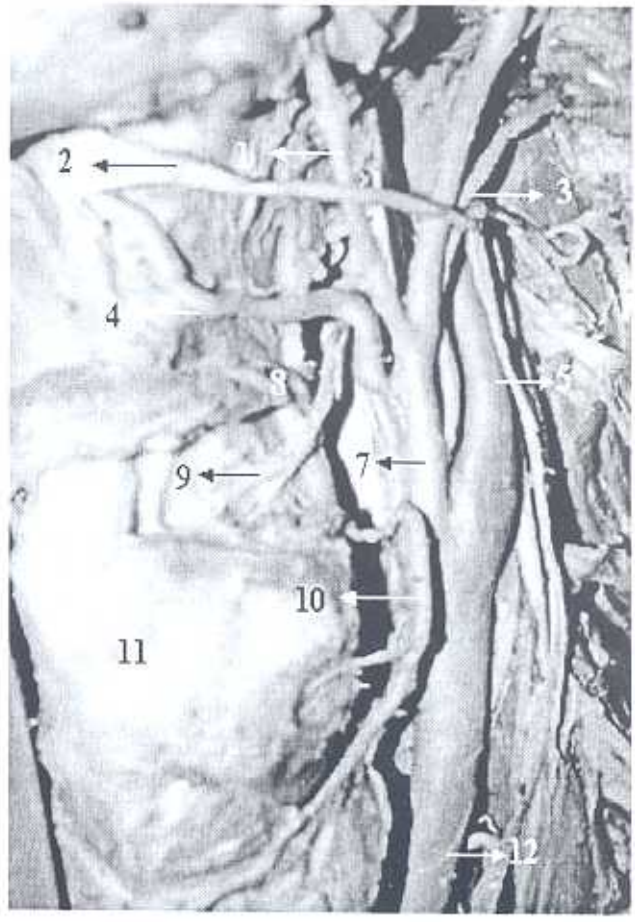

Figure 1. Lateral view of the left Tip I case, (1) Facial artery,(2) Hypoglossal nerve (3) Occipital artery,(4) Lingual artery, (5) Internal carotid artery, (7) External carotid artery, (8) Great horn of the hyoid bone, (9) Internal branch of the superior laryngeal nerve, (10) Superior thyroid artery, (11) Thyroid cartilage, (12) Common carotid artery

Figure 2. Lateral view of the left Tip II case, (1) Facial artery,(2) Hypoglossal nerve (3) Occipital artery,(4) Lingual artery, (5) Internal carotid artery, (6) Faciolingual trunk, (7) External carotid artery, (8) Great horn of the hyoid bone, (9) Internal branch of the superior laryngeal nerve, (10) Superior thyroid artery, (11) Thyroid cartilage, (12) Common carotid artery

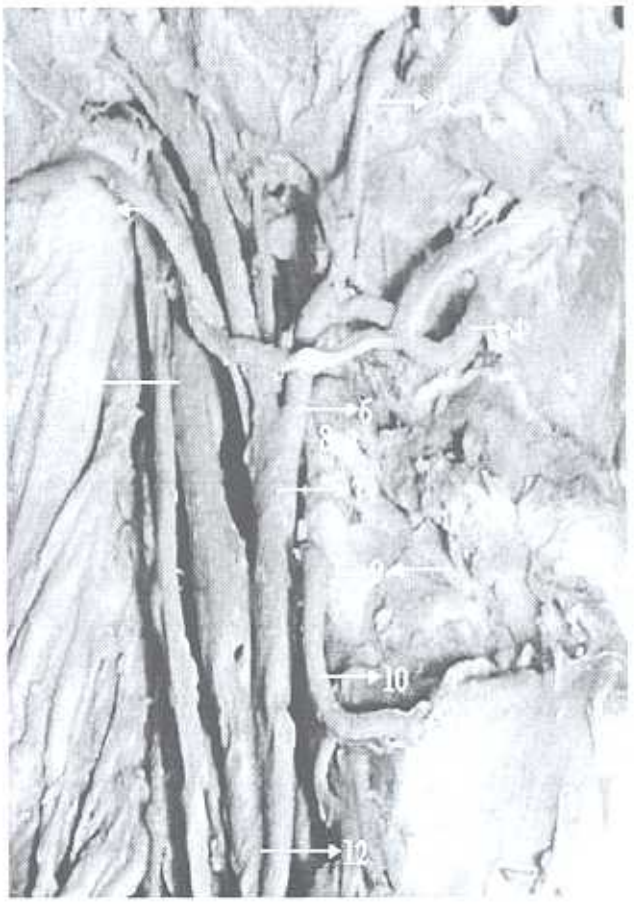

Figure 3. Lateral view of the right Tip III case, (1) Facial artery,(2) Hypoglossal nerve (3) Occipital artery,(4) Lingual artery, (5): Internal carotid artery, (6): Faciolingual trunk, (7) External carotid artery, (8) Great horn of the hyoid bone, (9) Internal branch of the superior laryngeal nerve, (10) Superior thyroid artery, (11) Thyroid cartilage, (12) Common carotid artery

Table I. The comparison of our results with other investigators' data

	Location	TLT-BC distance (mm)	TLT length (mm)	Frequency rate (%)
Ergur and Icke	Left	7.60	2.10	3.57
Babu et al	Right	20.00	-	0.25
Lemaire et al	-	30.00	5.20	-

Table II. The comparison of the percentage values of the FLT types

%	Adachi et al.	Doyon et al.	Kozielec et al.	Midy et al.	Soikkonen et al.	Wolf et al.	Ergur and Icke
Type I	81.3	77.3	57.0	92.5	84.0	76.0	85.7
Type II	-	2.7	-	-	3.0	6.5	3.6
Type III	18.7	20.0	43.0	7.5	13.0	17.5	10.7

DISCUSSION

In the review of the literature it was observed that FLT originated from ECA (6-11). Since the LA and FA have separate origins during development, the presence of a common trunk might be explained by an ectopic development FA springing from the LA. FLT has not been reported in any other species, indicating it to be a specifically human formation (12). The frequency rate of the FLT originating from the ECA was the highest (43 %) in the fetal series of the Kozielec and Joswa, on the other hand the lowest (14 %) in Lappas et al's series (11,13). Shima et al. and Shintani et al. stated that the frequency rate was 31 % and 21.7 % respectively (10,14). Comparison of the frequency rates, the results of Bergman et al's 10-20 %, Osborn's 10-20 %, Lucev et al's 20% and Hayashi et al's 18 % were similar to our result 16.66 % (7-9,15).

In the literature Type I, which has no FLT was observed as the most frequent type besides the Type II was the most occasional type (11,16-21). Parallel to these results, in our series the Type I was the biggest (85.7 %) and the Type II the smallest (3.6 %) part of all cases. The comparison of our results with the other authors data are presented in the Table II.

CONCLUSION

In literature the origin variations of the FA and LA were described in three types. In our study the most common type was Type I (85.7 %). This result was concordant with other publications in the literature. During the surgical approaches to the head and neck region, chemotherapeutic agent applications for the tongue cancers and radiologic diagnosis, branching variations of the vessels has got great importance for avoiding the complications (22-25).

This study is a good example for branching variations of facial artery and lingual artery that should be kept in mind and may be helpful during these procedures.

REFERENCES

1. Last RJ. Anatomy regional and applied. Seventh Edition. London: Churchill Livingstone, 1984; 374-377.
2. Lockhart RD, Hamilton GF, Fyfe FW. Anatomy of the human body. Fifth Edition. London: Faber and Faber limited, 1988; 599-605.
3. Cummings CW, Fredrickson JM, Harker LA et al. Surgical anatomy. In Otolaryngology Head and Neck Surgery. Third Edition. Baltimore: Mosby,1998;1677-1685.
4. Snell RS. Clinical anatomy for medical students. Fourth Edition. Boston: Little- Brown,1992; 930.
5. Testut L, Latarjet A. Traite d'anatomie humaine. Tome II: Angeiologie – systeme nerveux central. Nineth Edition. Paris: G Doin & Cie,1948; 213-262.
6. Williams PL, Bannister LH, Berry MM et al Cardiovascular system. In Gray's Anatomy.38th Edition. New york: Churcill Livingstone, 1995;1515-1520.
7. Bergman RA, Thompson SA, Afifi AK et al. Compendium of man Anatomic Variation: Catalog, Atlas and World literature. Baltimore and Munich: Urban & Schwarzenberg 1998; 64.
8. Lucev N, Bobinac D, Maric J et al. Variations of the great arteries in the carotid triangle. Otolaryngol Head and Neck Surg 2000; 122: 590-591.
9. Osborn GA, Jacobe JM, Maock J et al. Diagnostic Cerebral Angiography. Second Edition. Philadelphia: Lippincott Williams & Wilkins,1999; 31-55.
10. Shima H, Luedinghausen M, Ohno K, et al. Anatomy of Microvascular anastomosis in the neck. Plast Re-

constr Surg 1998;101: 33-41.

11. Kozielec T, Joswa H. Variation of the course of the facial artery the prenatal period in man. Folia Morphol 1977;36: 55-61.
12. Poisel S, Golth D. Zur Variabilitad der groben Arterien im Trigonum caroticum. Wien Med Wochenschr 1974; 124:229-232.
13. Lappas DA, Kamberos IG, Gisakis et al. Anatomic study of the variations in the origin of the branches of the external carotid artery. Iatriki 2002; 81;28- 31.
14. Shintani S,Terakado N, Alealde RE et al. An anatomical study of the arteries for intraarterial chemotherapy of head and neck cancer. Int J Clin Oncol 1999;4:327-330.
15. Hayashi N, Ohtani Y, Ohtani O et al. 1st. Joint meeting of EACA& AACA abstract book. Graz 2003;78-79.
16. Adachi B Das Arterien system der Japaner. Vol 9. Ed Kyoto: Kenkyusha,1928;58-96.
17. Brue E, Bey E, Cariou JL. Lartere faciae. Rappel embryologique, anatomie descriptive et fonctionnelle d'apre's unerevue de la litterature. Ann Chir Plast Esthet 2000;45: 461-484.
18. Doyon D, Vignaud J, Lasjaunias P et al. Arteriographie et phlebographie en ORL Encycl Med Chir. Paris: Elsevier, 1976;450-455.
19. Midy D, Mauruc B, Vergnes P et al. A contribution to the study of the facial artery, its branches and anastomoses; application to the anatomic vascular bases of facial flaps. Surg Radiol Anat 1986;8: 99-107.
20. Soikkonen K, Worlf J, Hietanen J et al. Three main arteries of the place and their tortuosity. Br J Oral and Maxillofac Surg 1991;29: 395-398.
21. Wolf J, Mattila K, Hietanen J et al. Astereo – angiografic study of the arterial variations in the external carotid system. Dentomaxillofac Radial 1985;14:45-52.
22. Damascelli B, Patelli GL, Lanocita R et al. A novel intraarterial chemotherapy using paclitaxel in albumin nanoparticles to treat advanced squamous cell carcinoma of the tongue: preliminary findings. Am J Roentgenol 2003;81:253-260.
23. Fuwa N, Ito Y, Matsumoto A et al. A combination therapy of continuous superselective intraarterial carboplatin infusion and radiation therapy for locally advanced head and neck carcinoma. Phase I study. Cancer 2000;89:2099-2105.
24. Shangkuan H, Xinghai W, Zengxing W et al. Anatomic bases of tongue flaps. Surg Radiol Anat 1998; 20: 83-88.
25. Zhao Z, Zhang Z, Li Y et al. The buccinator musculomucosal island flap for partial tongue reconstruction. J Am Coll Surg 2003;196:753-760.