

Unilateral agenesis of the facial artery with compensation by a giant transverse facial artery

R. Shane Tubbs¹, E. George Salter¹, W. Jerry Oakes²

¹Department of Cell Biology, University of Alabama at Birmingham, AL, USA

²Pediatric Neurosurgery Children's Hospital, Birmingham, AL, USA

[Received 3 June 2005; Accepted 4 July 2005]

During routine dissections carried out in the course of our medical gross anatomy work, an unusual structure was found unilaterally on the left side of an adult male cadaver. Upon investigation, this was determined to be a hugely dilated transverse facial artery. Also noted was the complete absence of the ipsilateral facial artery. To our knowledge, this is the first report of complete agenesis and not simply diminution of the facial artery with compensatory enlargement of the transverse facial artery.

Key words: face, blood supply, anomaly, variation

INTRODUCTION

The transverse facial artery is a small branch of the superficial temporal artery that parallels and travels superior to the parotid duct. However, this small branch can be detected with colour Doppler sonography [1]. Lasjaunias [5] has described this vessel as occupying a transitional position relative to the vessels of the scalp and those of the face proper. Despite the numerous anastomoses with the transverse facial artery, it is of only mediocre effectiveness in re-establishing the supply of occluded maxillary or facial arteries and seems to serve a complementary and supportive purpose rather than playing a key role in the arterial supply of the face [5].

CASE REPORT

During routine dissections carried out in our medical gross anatomy studies, an unusual structure was found unilaterally on the left side of an adult male cadaver who had died of natural causes. No other obvious anomalies were found in this specimen. The structure in question was found to be an enlarged

transverse facial artery originating from the superficial temporal artery. This artery measured 10.5 cm in length and was 5 mm in diameter (Fig. 1, 2). There was agenesis of the facial artery on this side with a normal facial vein. The contralateral side had a normal facial artery and vein and a normally-sized transverse facial artery. The enlarged transverse facial artery ended as a superior and inferior labial artery. There was no angular artery on this side.

DISCUSSION

Lee et al. [7] reported that the transverse facial artery arose as a single branch from the superficial temporal artery near the temporofacial division of the facial nerve in 60% of their specimens. These authors also described the largest component of the distal transverse facial artery as travelling between the zygomatic branch of the facial nerve and the parotid duct and a smaller branch that crossed deep to the parotid duct within 15 mm of the parotid gland. The transverse facial artery supplies muscles of the facial region such as the masseter [1]. This



Figure 1. The cadaver described in our study. Note the enlarged transverse facial artery (arrows).



Figure 2. A magnified view of the enlarged transverse facial artery (arrows) as seen in Figure 1.

vessel also gives branches to the anterior zygomatic area and superficial zygomatic branches that anastomose with the zygomatic branch of the zygomatico-orbital artery [5]. Godlewski et al. [4] have shown that the transverse facial artery may also contribute to the blood supply of the temporomandibular joint. Furthermore, Liao et al. [6] have demonstrated that the transverse facial artery supplies nutrient branches to the facial nerve on the face.

Hypoplasia of the facial artery has been described [5]. Soikkonen et al. [9] have shown that the smaller the facial artery, the larger the transverse facial artery will be. The transverse facial artery may be doubled, quadrupled, or arise directly from the external carotid artery [2, 7].

Dunn et al. [3] described a cadaver with an apparently enlarged transverse facial artery that travelled to the angle of the mouth where it then assumed the normal course of the facial artery. Poynter [8] reported that the facial artery may only be found with a cervical portion so that the face receives its main blood supply from the transverse fa-

cial artery, although this author did not comment on the size of the transverse facial artery. Lasjaunias [5] has stated that the farther away from the zygomatic arch the facial artery is found, the larger the transverse facial artery will be.

The transverse facial artery may be enlarged in cases of a hypoplastic facial artery. To our knowledge, this is the first report of complete agenesis of the facial artery and not simple diminution with compensatory enlargement of the transverse facial artery.

REFERENCES

1. Arijji Y, Kimura Y, Gotoh M, Sakuma S, Zhao YP, Arijji E (2001) Blood flow in and around the masseter muscle: normal and pathologic features demonstrated by color Doppler sonography. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*, 91: 472–482.
2. Bergman RA, Thompson SA, Afifi AK (1984) *Catalog of human variation*. Baltimore: Urban & Schwarzenberg.
3. Dunn LA, Washburn JW, Targett JH (1890) Abnormalities observed in the dissecting room of Guy's Hospital during the sessions 1888–1890. *Guy's Hosp Reports*, 32: 299–315.

4. Godlewski G, Bossy J, Giraudon M, Dussaud J, Pavart JC, Lopez JF (1978) Arterial vascularization of the temporo-mandibular joint. *Bull Assoc Anat (Nancy)*, 62: 229–236.
5. Lasjaunias PL (1981) Craniofacial and upper cervical arteries. Baltimore: Williams & Wilkins, p. 154.
6. Liao JM, Wang XH, Li ZH (2004) Applied anatomic study on blood supply for extracranial segment of facial nerve. *Chinese J Reparative Reconst Surg*, 18: 131–134.
7. Lee H, Yang H, Gil Y, Won H, Jang D (2002) Transverse facial artery and its relationship to the parotid duct and facial nerve. Presented at the 19th Annual Meeting of the American Association of Clinical Anatomists Gainesville, FL.
8. Poynter CWM (1922) Congenital anomalies of the arteries and veins of the human body with bibliography. *The University Studies of the University of Nebraska*, 22: 1–106.
9. Soikkonen K, Wolf J, Hietanen J, Mattila K (1991) Three main arteries of the face and their tortuosity. *Br J Oral Maxillofac Surg*, 29: 395–398.