Lateral external carotid artery and linguofacial trunk: a rare anatomic variant

Abstract
Knowledge of the variations of the arteries in the carotid triangle is important because its existence can have significant impact on treatment success, especially during surgical or radiological intervention in the region. During routine students dissection of an adult male cadaver as part of a functional human anatomy course, a rare anatomic variant was observed in the carotid triangle on the right side of the neck. The external carotid artery (ECA) and its anterior branches was located lateral to the internal carotid artery (ICA). In addition, the lingual and facial arteries arose in a common linguofacial trunk, which in this configuration coursed medially, crossing partially obscuring the ICA. Both the hypoglossal and internal laryngeal nerves were at a risk of injury since they lay directly over the linguofacial trunk and the ICA. This is the first case report of a linguofacial trunk arising from a lateral ECA. The transposition of the ECA and ICA and presence of a linguofacial trunk could have profound surgical implications including potentially limiting access to the ICA during carotid endarterectomy. It is also expected to cause difficulties for catheter insertion. In addition, the risk of bleeding during pharyngeal surgery is increased in cases in which the ICA is medially displaced due to its anomalous course.

Keywords: facial artery, lingual artery, internal carotid artery, hypoglossal nerve, endarterectomy

Abbreviations: ECA, external carotid artery; ICA, internal carotid artery

Introduction
Knowledge of the possible variations of the external carotid artery (ECA) in the carotid triangle is important, because its existence can have significant impact on treatment success and potentially lead to errors during surgical or radiological intervention in the neck region. The common carotid artery does not give off any branches in the neck, except giving rise to the ECA and internal carotid (ICA) arteries at the carotid bifurcation. The ICA runs a straight course from the carotid bifurcation to the entry in the temporal bone without branching. The ECA supplies anterior branches to head/neck structures including the superior thyroid, lingual and facial arteries. These arteries originate separately from the ECA in 77.8% of cases; however, a linguofacial trunk, thyrolinguofacial trunk and thyrlo-linguofacial trunk have also been observed, although much less frequently. Normally, the ECA lays medial to the ICA. This case report describes a rare anatomic variant in which the ECA lies lateral to the ICA and gives rise to a linguofacial trunk which in this configuration courses anterior to the ICA, greatly hindering its identification.

Case report
During routine student’s dissection as part of a functional human anatomy course, a rare anatomic variant was found at the level of the right carotid triangle of an adult Caucasian male cadaver. On that side, distal to the carotid bifurcation, the ECA and its anterior branches was located lateral to the ICA, medial to the internal jugular vein. After giving off the superior thyroid artery at the carotid bifurcation, a common linguofacial trunk originated from the ECA, which in this configuration coursed medially, crossing and obscuring the ICA, thus potentially limiting surgical access to the vessel (Figure 1A) (Figure 1B). The lingual and facial arteries originated from the linguofacial trunk, medial to the ICA. Slightly distal to the origin of the linguofacial trunk, the ascending pharyngeal artery arose from the ECA traveling between it and the ICA. The hypoglossal nerve coursed lateral to the ECA before passing anterior to the linguofacial trunk and continuing on superior to the digastric tendon. Retraction of the linguofacial trunk, to improve exposure of the ICA, placed the nerve under tension. In addition, the descending branch of the hypoglossal nerve was at a risk of injury since it descended directly over the linguofacial trunk and ICA. As can be seen in Figure 2, the branching pattern of the vessels in the contra lateral carotid triangle was normal without any variations. The left ECA is located medial to the ICA and the superior thyroid, lingual and facial arteries arise separately from the ECA.
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A lateral ECA and linguofacial trunk (LFT) were present on the right side of the neck. The ECA is normally located medial to the ICA, while the LFT originates from the lateral ECA and courses medially, crossing the LFT and ICA. This variant is rare, with an incidence of approximately 14%.

Discussion

This case report describes the presence of both a lateral ECA and linguofacial trunk on the right side of the neck. It is important to be aware of such arterial variations to avoid complications during surgeries.

Conclusion

The presence of a lateral ECA and linguofacial trunk may pose a danger during surgeries like thyroidectomy. Surgeons and radiologists should be aware of such variations to minimize complications.

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Conflict of interest

Author declares that there is no conflict of interest.

References

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