

# An Anatomical Variant: Low Lying Common Carotid Artery Bifurcation

Yogendra Singh Chauhan, Srijon Mukherji

## ABSTRACT

The common carotid artery usually bifurcates into the internal and external carotid arteries at the level of C3-C4. Injury to common carotid artery during neck dissection is encountered rarely. Knowing the anatomical variation of common carotid like low lying bifurcation would prevent inadvertent injury especially by budding head-neck surgeons. We report a case of 46-year-old male undergoing surgery for carcinoma of tongue with Supraomohyoid neck dissection. He had low-lying bifurcation of the common carotid artery.

**Keywords:** Low lying common carotid artery, Supraomohyoid neck dissection, Carcinoma of tongue.

**How to cite this article:** Chauhan YS, Mukherji S. An Anatomical Variant: Low Lying Common Carotid Artery Bifurcation. *Int J Head Neck Surg* 2013;4(2):105-106.

**Source of support:** Nil

**Conflict of interest:** None declared

## INTRODUCTION

Neck dissections of any type is performed to selectively or radically removes level Ia-Ib, IIa-IIb, IIIa-IIIb, IV, V and VI lymph node groups, along with sternocleidomastoid muscle, internal jugular vein, spinal accessory nerve, submandibular glands along with deep cervical fascia. It is performed depending on the site of lesion and aggressive nature of lesion. The common carotid artery (CCA) divides into two terminal branches: Internal and external carotid artery. Ozgur et al<sup>1</sup> emphasized that knowledge of the CCA and its branches are important for vascular surgical procedure in the neck region. Gulsen et al<sup>2</sup> mentioned that the CCA generally bifurcates into the internal and external carotid arteries at the level of C3-C4. Ito et al<sup>3</sup> found that the location of the external and internal arteries was reversed. Lucev et al<sup>4</sup> mentioned that lack of experience regarding possible variations could lead to fatal errors. The great blood vessels and their exploration are essential for a better anatomic knowledge of the neck. This knowledge is very important in choosing surgical approaches and neck dissection by head and neck surgeons for benign and malignant tumors of head and neck region including skull base surgeries. It also includes the list of vascular surgeons, neurosurgeons and interventional radiologists working in collaboration with head and neck surgeons.

## CASE REPORT

In this article, we report the case of 46 years old male presented with an ulceroproliferative lesion of tongue and diagnosed

as carcinoma of tongue. The patient underwent near total glossectomy with supraomohyoid neck dissection.

During dissection of carotid triangle, low lying bifurcation of CCA was noted (Fig. 1). The bifurcation was seen at the level of C6 (Fig. 2). Superior thyroid artery was found to be directly branching at C6 to form superior vascular pedicle.

Due rarity of presentation of such low lying bifurcation, we add to the knowledge of head and neck surgeons about such anatomical variation of great vessel.

## DISCUSSION

### The Carotid Bifurcation

Several anatomic textbooks state that the CCA bifurcates into the external and internal carotid arteries at the level of the

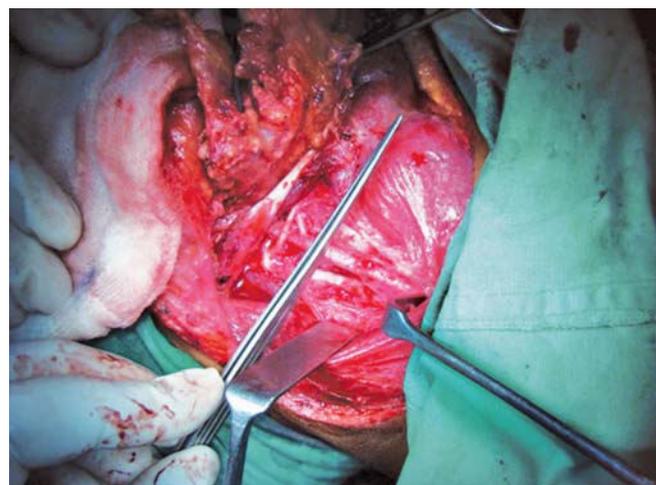


Fig. 1: Upper border of thyroid cartilage

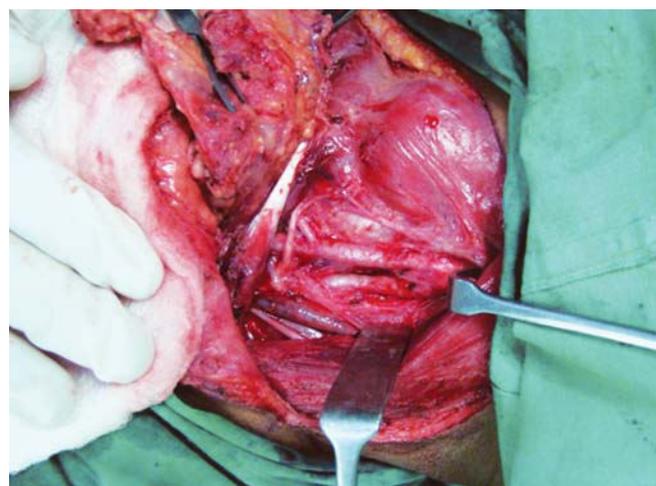


Fig. 2: Low lying bifurcation of CCA

superior border of the thyroid cartilage.<sup>1,5-7</sup> Lucev et al<sup>2</sup> found this to be true in 50% of cases and Ilic et al<sup>8</sup> reported a similar finding in 58% of cases. In addition, Espalieu et al<sup>9</sup> found it to be true in 65% of cases, as well as Von Poisel and Golth<sup>7</sup> who found it in 67%. CCA may bifurcate higher or lower than the usual; a high bifurcation is more common. The bifurcation can occur as high as the hyoid bone or even higher than, or as low as, the lower border of thyroid cartilage. These variations are of clinical importance for surgical approaches in the head and neck region.

Standring<sup>6</sup> mentioned a higher level of bifurcation opposite the hyoid bone. Ito et al<sup>3</sup> found this level in 31.2% and it was detected in 12.5% of the cases examined by Lucev et al.<sup>2</sup> It was also described by Kipre et al<sup>10</sup> in 13% of his examined cases.

Ilic et al<sup>8</sup> in his study found carotid bifurcation at the level below the upper border of the thyroid cartilage in 11% of his cases. Lucev et al<sup>2</sup> found it in 12.5% of cases, and Kipre et al<sup>10</sup> recorded it in 15% of cases.

The present article with respect to available literature suggests that vessels show great variability. Thus, surgeons must be very cautious and take all possibilities into consideration during neck dissections.

## REFERENCES

1. Ozgur Z, Govsa F, Ozgur T. Anatomic evaluation of the carotid artery bifurcation in cadavers; implication for open and endovascular therapy. *Surg Radiol Anat* 2008;30:475-80.
2. Gulsen S, Caner H, Altinors N. An anatomical variant: Low lying bifurcation of the common carotid artery and its surgical implications in anterior cervical dissection. *J Korean Neurosurg Soc* 2009;45:32-34.
3. Ito H, Mataga I, Kageyama I, Kobayashi K. Clinical anatomy in the neck region the position of external and internal carotid arteries may be reversed. *Okajimas Folia Anat Jpn* 2006;82:157-67.
4. Lucev N, Bobinac D, Maric I, Drescic I. Variation of the great arteries in carotid triangle. *Otolaryngol Head Neck Surg* 2000;122:590-91.
5. Krmpotic-Nemanic J. Anatomical variations and malformations of the head and neck GefaBge area. *Arch Oto-RhinoLaryngol* 1978;219:1-91.
6. Standring S. *Gray's anatomy: The anatomical basis of clinical practice* (39th ed). Elsevier, Churchill Livingstone, Edinburgh, London, New York, Oxford, Philadelphia, Sydney, Toronto 2005.
7. Von Poisel S, Golth DZ. Arteries of the large variability in the carotid triangle. *Wien Med Wochenschr* 1974;15:229-32.
8. Ilic A, Bogdanovic D, Jelacic NO. Method of collection of the first slope of the carotid artery. *Serbian Archieve* 1973;2:117-22.
9. Espalieu P, Cottier M, Relave M, Youvarlakis P, Cuilleret J. Radio-anatomic study of the carotid axis with regard to the implantation of microsurgical vascular anastomoses. *Surg Radiol Anat* 1986;8:257-63.
10. Kipre YZ, Quattara D, Broalet E, Kouakou F, Gotta FS, Kakou M, et al. Investigation of the collateral branches of the external carotid artery in population from West Africa. *Morphologie: Bulletin des Anatomists* 2008;92:176-80.

## ABOUT THE AUTHORS

### Yogendra Singh Chauhan (Corresponding Author)

Surgical Fellow, Department of ENT and Head and Neck Surgery Calcutta Institute of Maxillofacial Surgery and Research, Kolkata West Bengal, India, e-mail: dr.yogendrad@yahoo.com

### Srijon Mukherji

Consultant, Department of Maxillofacial Surgery, Calcutta Institute of Maxillofacial Surgery and Research, Kolkata, West Bengal, India