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### Case report

# A rare association of curving and looping of internal carotid artery and variation in the branching pattern of external carotid artery –a case report

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#### ABSTRACT

During the routine dissection of neck region in an approx 50 year old male cadaver in the department of Anatomy at Maharajah's Institute Of Medical Sciences, Vizianagaram, a rare unilateral variation in the branching pattern of common carotid artery and external carotid artery in association with abnormal curving and looping of Internal carotid artery on right side was noticed. Knowledge of variations in ICA and the origin, course and branches of ECA is important for surgeons and also for the radiologist to interpret carotid system imaging.

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### 1. Introduction

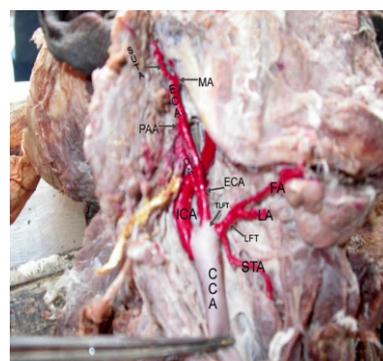
The common carotid arteries (CCA) are largest bilateral arteries of head and neck. The CCA of both sides divide at the upper border of thyroid cartilage i.e., at the level between 3rd & 4th cervical vertebrae into external and internal carotid arteries. The ICA usually follows a straight path from the bifurcation to the skull base. Undiagnosed kinks or loops in ICA i.e., aberrant ICA can be mistaken for a tumour or an abscess and susceptible to devastating injuries during routine ENT procedures such as tonsillectomy and drainage of peritonsillar abscess. The ECA system supplies facial structures, scalp, superior pole of thyroid gland and portions of cerebral duramater. The ECA and its branches are involved in a variety of lesions. Variations in branching pattern of ECA are well known and documented. The presence of anomalous ICA with variant branching pattern of ECA is unique anatomical variant. This knowledge can help radiologists to understand and interpret carotid system imagings. It is essential to have sound knowledge about vascular variations for application of angiography in the diagnosis of lesions affecting the neck, face, scalp and dura.

### 2. Case report

During routine dissection for undergraduates, a rare association of aberrant ICA and anomalous branching pattern of

ECA had been noticed in a male cadaver of approx 50 years old. On right side a relatively high division of CCA at the level of greater cornua of hyoid bone. Superior thyroid artery, lingual artery and facial arteries originated from CCA as a common trunk. Superior thyroid artery descended downwards and medially towards upper pole of lateral lobe of thyroid gland. The linguo facial trunk traversed medially and divided into lingual and facial arteries. Occipital artery originated from CCA in between ICA & ECA. ECA originated from CCA in between the occipital and the common linguo facial thyroid trunk and ascends upwards. Ascending pharyngeal artery was absent. Posterior auricular artery originated from ECA at 1cm above the angle of the mandible. Behind the neck of the mandible ECA terminated as Superficial temporal and Maxillary arteries. ICA originated from CCA lateral to the occipital artery and presented a reverse 'S' shaped loop from lateral to medial side behind occipital artery and ECA (Fig: 1). On the left side, bifurcation of CCA and branching of ECA were normal.

**Fig 1: Showing the high bifurcation of the CCA into ECA & ICA, variant branching of ECA and curving and looping of ICA.**



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### 3. Discussion

Arterial aberrations are typically asymptomatic. Aberrant arteries are not uncommon. The CCA bifurcates into ECA & ICA at the upper border of thyroid cartilage i.e., at third cervical vertebra [1]. Philippe Gailloud et al [2] reported intra thoracic carotid bifurcation at T4. Bifurcation of CCA as high as at the hyoid bone i.e., at C2 have been reported by Gluncic et al [3] and Thwin et al [4]. The origin of occipital artery from carotid bifurcation has been reported by Quain 1884 [5], Livini 1903 [6], Adachi 1928 [7]. Lasjanuias et al [8] reported 3 different types of the originating point of Ascending pharyngeal artery i.e., 1) from carotid bifurcation, 2) from ICA, or 3) from ECA along with occipital artery. But absence of Ascending pharyngeal artery was not reported in the literature so far. In the present case APA was absent. Hollinshed [9] mentioned that the origin of Superior thyroid artery from CCA is not uncommon and it is found in 45% of cases. Zumre et al [10] in their study on human fetuses found a linguo facial trunk in 20%, a thyro lingual trunk in 2.5% and a thyro-linguo-facial trunk in 2.5% of human fetuses. In our case a thyro-linguo-facial trunk was noted on right side.

Variations in the course of cervical ICA have been reported to occur in 4-66% of general population [11]. Paulsen et al [12] found kinking in 4.3% of cases. The etiology of ICA aberrations is unknown, but it is likely the result of a combination of embryologic mal development and acquired diseases. A complicated process of transformation of the embryonic aortic arch system, which involves regression & disappearance, retention or reappearance of its components, may result in congenital anatomical variations in the origin and courses. Atherosclerosis and the fibromuscular dysplasia of tunics of the carotid arteries are the acquired factors and they may result in cerebral emboli or intermittent stenosis in elderly patients [13]. An aberrant ICA may enlarge the pharyngeal wall and narrow the diameter of airway. This altered anatomy may result in obstructive sleep apnea [14].

### 4. Conclusion

The present study highlights the variation in the branching pattern of CCA, ECA & aberrant ICA. Knowledge of these vascular variations may be gainful for surgeons and also for interpretation of diagnostic and interventional vascular procedures by radiologists.

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### Abbreviations

1. CCA: Common Carotid Artery.
2. ECA: External Carotid Artery.
3. ICA: Internal Carotid Artery.
4. OA: Occipital Artery.
5. TLF: Thyro Linguo Facial Trunk.
6. LFT: Linguo-Facial Trunk.
7. STA: Superior Thyroid Artery.
8. LA: Lingual Artery.
9. FA: Facial Artery.
10. PAA: Posterior Auricular Artery.
11. SUTA: Superficial Temporal Artery.
12. MA: Maxillary Artery.

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