

Anatomical Variation of the Common Carotid Artery in neck Dissection- Cervical carotid siphon

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Abstract: Knowledge of incidence of morphological variations in the course and branching of the carotid arteries is important for radiological interpretation and surgical correction when they are symptomatic. Internal carotid artery (ICA) is known to show elongation in its extra cranial course. Previous studies have demonstrated the incidence and clinical symptoms of this morphological entity. However, the occurrence of elongation and looping of the common carotid artery (CCA) is seldom reported in the literature. During regular dissections, we came across a rare case of unilateral morphological variation of common carotid artery, in a female cadaver aged about 55 years. CCA presented a pronounced kinking or coiling, 2 cm above the origin of CCA.

Keywords: Common Carotid Artery (CCA and Siphon)

I. Introduction

Common carotid arteries chiefly supply the head and neck region. Each common carotid artery bifurcates into external carotid artery (ECA) and internal carotid artery (ICA). According to classical text book description, the carotid arteries run straight in the neck region (1). Rarely, they show coiling in their course (2). Compared to ECA, ICA more frequently presents such morphological entity (3). Usually, ICA begins at the level of the lamina of the upper border of the thyroid cartilage and enters into the temporal bone. If the distance between these two points is lesser than the vessel length, it leads to coiling, looping and kinking of the vessel (4). However, these conditions are thought to occur due to the benign angiopathy (5) or neurological complications (6) or also considered as congenital anomalies (3). The knowledge of morphological variants of carotid arteries is important while performing procedures such as tonsillectomy, peritonsillar abscess drainage, soft palate impalement injuries, adenoidectomy and velopharyngeoplasty (3). Herein, we report a unilateral variation of both the ECA and ICA in the neck region, and discuss its clinical importance.

II. Material and methods

23 in the right and 23 in the left side, of formal-fixed adult cadavers, of both sexes were dissected from the chalmeda anand rao medical college, karimnagar from 2013 - 2016. We came across a rare unilateral morphological variation in the course of the common carotid artery in a single female cadaver of aged approximately 55 years. The variation was observed on the left side of the neck and was unilateral.

III. Discussion

Classically, the carotid arterial system presents constant origin and course in the superior mediastinum and neck (1). When compared to CCA and ECA, ICA frequently shows variations in its course and forms coiling, looping and kinking or tortuosity (3). In 1951, Riser et al (7) have demonstrated the association between the carotid kinking and cerebrovascular insufficiency. Variations of ICA are could be due to developmental errors of aortic arteries (3) as looping and kinking is also reported to occur in the infants and fetuses (8). During the ICA development, usually major portions of segmental arteries that contribute to its formation disappear. Rarely they may persist and give rise to the anomalous branches of the ICA (9). Any developmental errors in the descent of heart and great vessels into superior mediastinum or failure of absorption of the third aortic arch or the upper intersegmental artery result in the elongation of the ICA (10).

Though the morphological variants of the course of the ICA are frequently defined by using different terms coiling, looping, kinking and S or C shaped elongation, tortuosity is appropriate term that can replace others (11). Paulsen et al. (3) have classified the course of ICA into four types. According to them, if the deviation from the vertical axis is less than 15°, it is straight. If the deviation is greater than 15° and lesser than 70°, then it is curved. If the deviation lies between the 90° and 145°, then it is classified as coiled or kinked. If

the deviation is 360°, it is looped. Further, they subdivided the curving into medial, lateral or ventrodorsal. In the present study, 99% of cases presented straight course, 1% of case had curved course of CCA. The middle segment of the CCA presented a lateral siphon and the convexity of the curve was directed posterior to the internal jugular vein and the vagus nerve. This siphon was situated just 2cm above the origin of CCA. Unusual looping of the ICA in relation to an enlarged lymph node has been observed in a cadaver (12). Tortuosity of the ICA is rarely associated with clinical symptoms (10). The variants of the ICA may lead to degenerative alterations in the blood vessels with increase in age (3). The close relationship of the tortuous ICA with pharyngeal wall can cause difficulties in swallowing and speech and it may lead to difficulty to surgeons in this area (3). Individuals with tortuous ICA may present with focal neurological and hemispheric symptoms (3).

Though the elongation, coiling, looping or kinking of ICA is common, it is extremely rare to have these variations with respect to the ECA (13). A cadaveric case of ECA forming S shaped loop has also been reported (13). The developmental arrest in the shifting of heart and large blood vessels into the superior mediastinum or shifting of origin from the aortic sac to third aortic arch may attribute to the formation of kinks in the ECA (10). Early diagnosis of kinking of the ECA is clinically important as it is frequently associated with stenosis, vasculitis, atropic dilation and arteriosclerosis (14).

IV. Conclusion

Anatomical knowledge of variations in the origin, course, and branching pattern of the carotid arteries will be useful in angiographic studies, transcatheter embolization procedures and in surgical procedures of the head and neck region. Though lateral curvature(looping or siphon) of the CCA is not an uncommon finding.

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Common carotid siphon(left)

1-common carotid siphon, 2-internal jugular vein, 3-vagus nerve

