

Variation in the origin of Left Common Carotid Artery - A case report



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Abstract

The left common carotid artery is the second branch among the three branches of arch of aorta. In this case a variation of the origin of left common carotid artery was found during our routine dissection class. The left common carotid artery arises from the root at its origin of the brachiocephalic trunk and then further it runs towards the left side of the neck. The detail will be discussed in the case study. Awareness of anatomical and morphological variation of aortic arches and its branches are important in surgical and diagnostic procedures in the thorax and neck disorders.

Key words Arch of Aorta, Left Carotid artery, Brachiocephalic trunk

Introduction

The right and left common carotid arteries are principal arteries of the head and neck region. The common carotid arteries differ in length and in their mode of origin. The right common carotid artery begins at the bifurcation of the brachiocephalic trunk as common carotid and subclavian artery behind the right sterno clavicular joint and is confirmed to neck. Left common carotid artery springs from the highest part of the arch of aorta immediately behind and to the left of brachiocephalic trunk and therefore the left common carotid artery consist thoracic and cervical part. [1] The embryological origin of common carotid artery is derived, on either side, from part of the third arch artery, proximal to the external carotid bud. [2] We found in 84yrs old male cadaver the variation of origin of the Left common carotid artery during our routine dissection, which was originated directly from the root of brachiocephalic trunk. Further there are no any other branches from arch of the aorta

except the left subclavian artery.

Observation

Usually the right common carotid artery is a branch of brachiocephalic trunk on right side and left common carotid artery is the direct branch from arch of the aorta. During our routine P.G dissection class, in the department of Anatomy, S.D.M college of Ayurveda, Udupi the male cadaver aged about 84 yrs. showed a variation referring to branches springing from arch of the aorta. After resection of the anterior thoracic wall, we removed carefully the fatty tissue and pericardium which covers the heart and the root of the great vessels, noticed the anomalous origin of left common carotid from the brachiocephalic trunk. In this case the arch of aorta had only two branches. They originated from upper convex surface of arch of aorta. The first branch was brachiocephalic trunk, and the second branch was left subclavian artery. The left common carotid artery originated from the root of brachiocephalic trunk. This artery crossed the

trachea anteriorly, and runs towards the left side and then entered the left side of the neck. Only the variation was there in its origin and later its course and relations were found to be normal. No any other branches like vertebral artery and thyroidea ima artery were found arising from the arch of aorta except left subclavian artery.

Discussion

In general, there are three branches which are arising from the convex aspect of the arch of the aorta.

1. The brachicephalic trunk 2. Left common carotid
3. Left subclavian artery. From literature, it is seen that the arch of aorta shows some variation in its mode of branching and they may branch from beginning of the arch or upper part of ascending aorta (65- 80%). The distance between the origins may be increased or decreased, the most frequent being the approximation of left common carotid artery to brachiocephalic trunk.

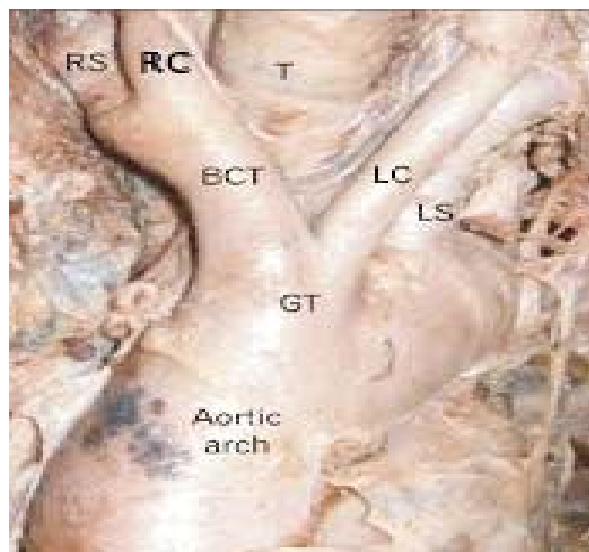


Figure - 1 Showing left common carotid artery arising from brachiocephalic trunk.

GT- great trunk,
LC left common carotid,
LS left subclavian,
BCT brachiocephalic trunk,
RC right common carotid,
RS right subclavian,
T- trachea

The primary branches from aorta may be reduced to one, but more commonly into two. The left common carotid artery may arise from the brachiocephalic trunk, left common carotid and left subclavian artery both may arise from left brachiocephalic trunk, common origin of left common carotid and brachiocephalic trunk, right common carotid and right subclavian may arise separately, some time the left vertebral artery may take its origin from aortic arch between the left common carotid and left subclavian arteries. The left vertebral artery originating from aorta at upper angle of junction of left subclavian artery, very rarely there may be external and internal carotid arteries arise separately from arch of aorta.

The common carotid artery being absent on one or both side, the vertebral arteries may be separate branches. When right aorta occurs, the arrangement of its three branches is reversed. The common carotid artery may have a single trunk. The common carotid artery usually has two terminal branches one external carotid and second one is internal carotid at the level of thyroid cartilage, but sometimes it may give origin to the vertebral, superior thyroid or its laryngeal, ascending pharyngeal, inferior thyroid, or occipital arteries.

The previous studies which carried out by different scholars which have showed various types of branching pattern of arch of aorta.

Anson analysis of variation in 1000 aortic arches showed usual pattern in 65%, left common carotid shared the brachiocephalic trunk in 27% and four large arteries branched separately in 2.5%. The remaining 5% showed variety of patterns, the most common 1-2% being symmetric right and left brachiocephalic trunk.^[3]

Study conducted by Adachi in 516 Japanese cadavers found branching Type A - Normal pattern in 80 %, Type B - Left common carotid incorporated in brachiocephalic trunk in 11 %, and Type C - Left vertebral artery as fourth branch. The present case study belongs to type B [4].

Study conducted by Nayak et al in 62 aortic

arches, identified that 4.8 % presented left common carotid arising from the brachiocephalic trunk with different degree of branches [5]. Uchino et al conducted CT angio-graphic study on 2351 patients and in their study left common carotid artery arose from brachiocephalic trunk in 6%. [6]

Study conducted by Nitra et al by CT chest of 687 patients showed left common carotid from brachiocephalic trunk in 5.9 % [7]. In study conducted by De Garis CF et al in aortic arch branching pattern left common carotid from brachicephalic trunk was found in 25 % of blacks and only 8 % of whites, more being in blacks. [8]

In cadaveric study conducted by Rekha et al, out of 110 cadavers 2.73% showed origin of left common carotid artery from brachiocephalic trunk. [9]. Because of the many changes involved in transformation of embryonic aortic arch system into adult arterial pattern, it is understandable that variations may occur. Most anomalies result from persistence of parts of the aortic arches that normally disappears or from disappearance of parts normally persist. The proximal part of third aortic arch normally gets extended and absorbed into the left horn of aortic sac. If it gets absorbed into the right horn of aortic arch, it can lead to anomalies where left common carotid arise from brachiocephalic trunk. Some type of aortic arch anomalies is associated with

Origin of left common carotid is slightly shifted to right side so that it is incorporated with brachicephalic trunk and comes in straight line with ascending aorta. This may be the reason on to increased blood flow in left common carotid artery. This direct flow of blood from aorta to brain or imbalance of flow of blood on left and right side of circle of Willis may cause of increased incidence of cerebrovascular disease in cadavers of Type II pattern.

Conclusion

The knowledge of variation in the branching pattern of aortic arch is of great importance in patients who have to undergo four vessel angiography, aortic instrumentation or supra aortic head and neck surgeries. The knowledge of abnormal branches originating from aortic arch is important in diagnosis of intra cranial aneurysm following subarachnoid hemorrhage. The knowledge of variation of brachicephalic trunk is necessary for cardiac catheterization and to perform safely endovascular surgery.

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Schematic diagrams of variation of branches of the arch of aorta

Figure 2 (long length of BCT)

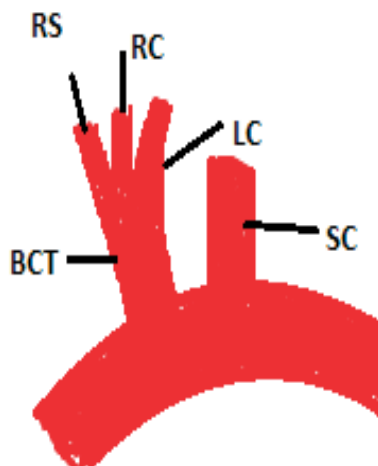
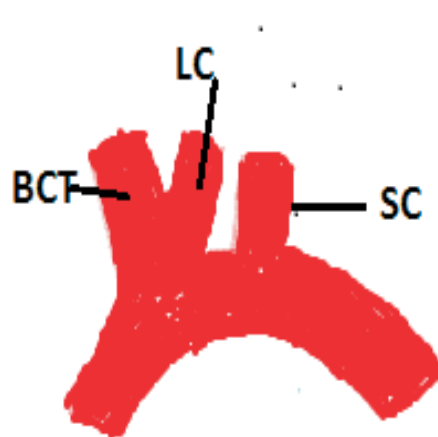


Figure 3 - (Short length of BCT)



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