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# Abnormal branching pattern from the arch of the aorta: A common trunk arising from arch of the aorta

***Emmanuel Suluba[1], Saikarthik Jayakumar[2]**

[1] Department of Anatomy, Muhimbili University of Health and Allied Sciences, Dar es Salaam, Tanzania

[2] Department of Anatomy, School of Medicine, St Joseph University; Dar es Salaam, Tanzania

***Corresponding Author**

Emmanuel Suluba
Department of Anatomy,
School of Medicine
Muhimbili University of Health and Allied Sciences,
P.O. Box 65001
Dar es Salaam, Tanzania

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**Abstract**

This case report describes the variation of branches of the arch of the aorta. The variation was discovered from a male cadaver at St Joseph University during routine dissection of the structures within the thoracic cavity. We found the common trunk which arises from the arch of the aorta. This trunk eventually divided into two branches namely; the brachial cephalic trunk and the left common carotid artery. This is the deviation from the normal branching pattern of the arch of the aorta. Knowledge on this important vascular variation from the arch of the aorta is significant in both invasive surgical procedures and for diagnostic purposes of the thorax and areas of the head and neck. During endovascular procedures, we insert the catheter through femoral artery to the abdominal aorta and further to the arch of the aorta. Awareness of the variation is therefore important as the above mentioned technique may be difficult to perform in case of the anatomical variations of the arch of the aorta. This type of variation is very rare and hence knowledge of such variations is of prime importance to surgeons, cardiologist and interventional radiologist during surgeries or any other imaging procedures.

**Key words :** Arch of the aorta, brachial cephalic trunk

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**Introduction**

The classical patterns of branches originating from the arch of the aorta are; the brachial cephalic artery, the left common carotid artery and the left subclavian artery.However, it has been found many variations may arise from the arch of the aorta. These variations which arise from arch of the aorta are the result of different types of transformation of primary branchial arch vessels, particularly the fourth brachial arch[1]. Variations involving the subclavian arteries, common carotid arteries, left coronary arteries and vertebral arteries arising from the aorta have been demonstrated in several studies[2 3 4]. Knowing the variation of the branching pattern of the arch of the aorta is very important during emergency intervention particularly in cardiothoracic procedures**.**

**Case report.**

During routine dissection at St Joseph Cadaveric room, we opened the thoracic cavity in order to study the mediastinal structures. During examination of the heart and after opening the lumen of the arch of the aorta, in one of the cadavers we found two ostium with only two major branches arising from the arch of the aorta. These were the common trunk which divide after short distance into two branches namely, the branchial cephalic trunk and the left common carotid artery. The other branch was the left subclavian artery which arises separately from the arch of the aorta. This is the deviation from the normal.No any other congenital malformation was found.

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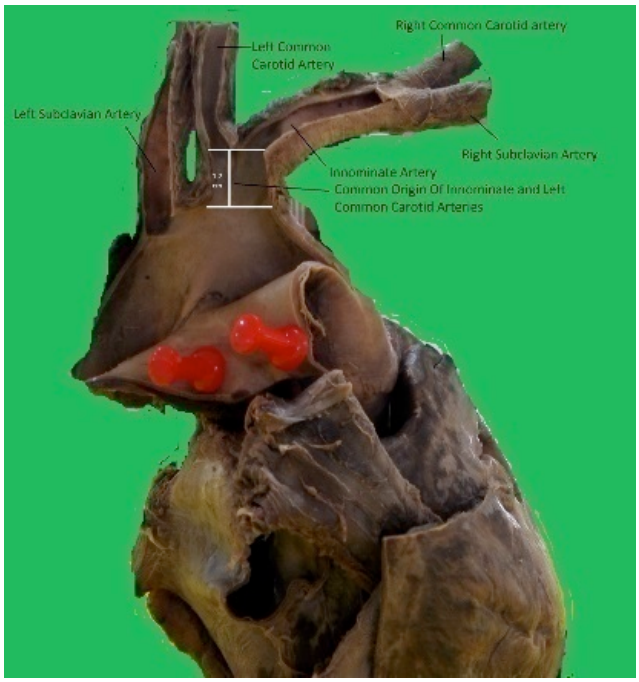


**Lumen Open**

**Posterior views**

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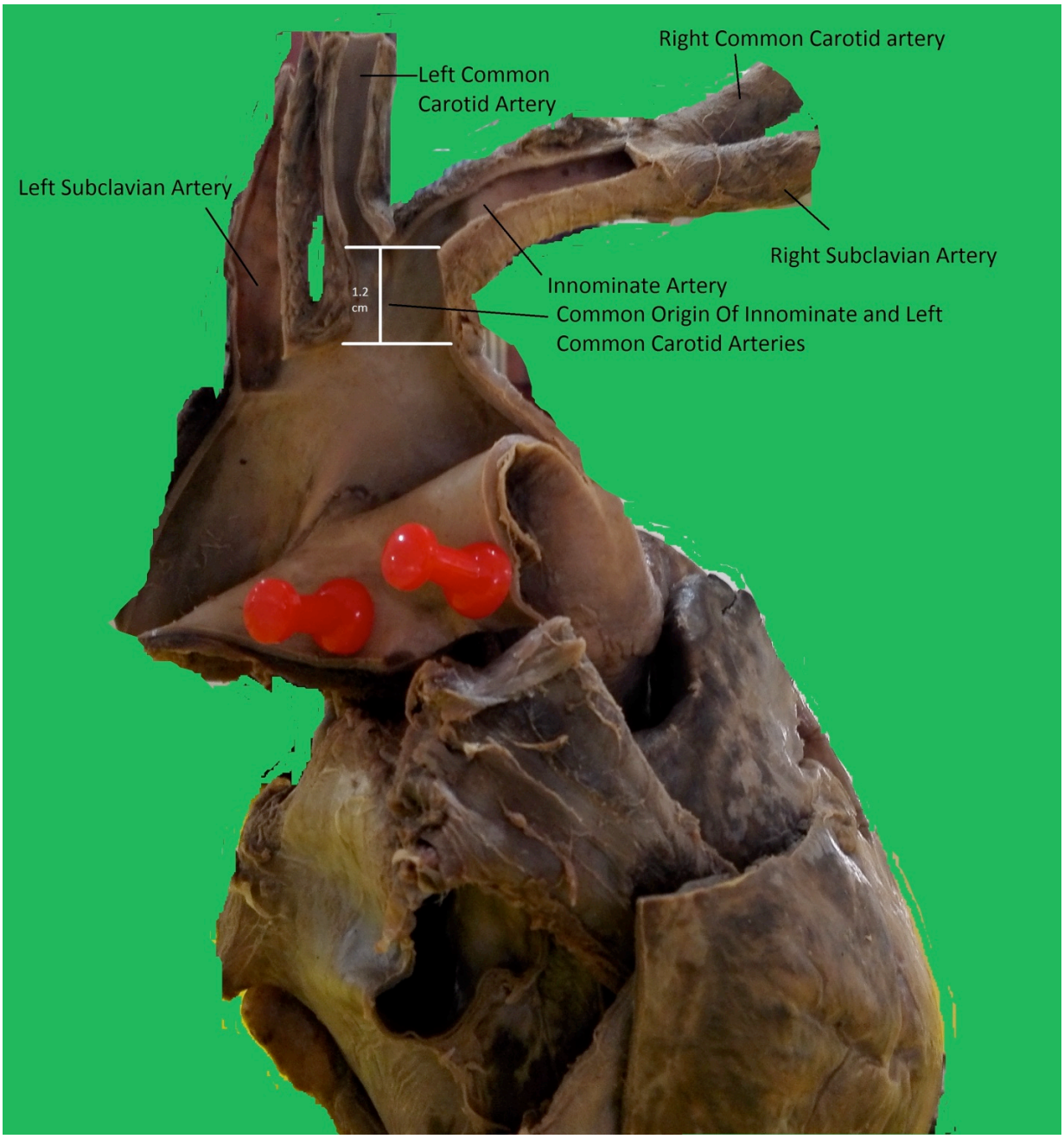


**Figure 2. Posterior view of the heart shows the arteries originating from the arch of the aorta with common ostium for brachial cephalic trunk and left common carotid artery.**

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**Discussion**

In classical arrangement, the arch of the aorta normally gives rise to three branches namely are brachial cephalic trunk, the left common carotid artery and the left subclavian artery. However,several variations can occur. The study have shown common trunk for brachiocephalic trunk and left common carotid artery occurs in 14.91% of the individuals,with classical arrangement account for 74.46% [5].In another study classical pattern was found in 27(75%) and in about 2(22.2%) there was additional left vertebral artery arising from the arch of the aorta[6] The common origin of the brachial cephalic trunk was also found to be 2.72% among Indian adults[7]. Few of the studies conducted earlier presents an interesting pattern that this anatomical variation occurs more in African descents[8].Knowledge on anatomical variation of vessels arising from the arch of the aorta is important for safe surgical procedures. These procedures are such as balloon angioplasty for the management of stenotic and occlusive lesions of the supra aortic trunks[6].Therefore it is important for both endovascular interventionists and diagnostic radiologists[4].

In addition, variations in the branching pattern of branches from the arch of aorta have been correlated with higher incidence of cerebrovascular diseases. This may be due to increased blood flow from the common trunk with increased pressure when compared to the circulation in the left common carotid artery as the fusion of brachiocephalic trunk with left common carotid artery shifts the later more medially, resulting in imbalance in the pressures between right and the left

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sided carotid circulation [9]. This type of variation occurs due to failure if the right and left limbs of the aortic sac to bifurcate[10,11].

A knowledge of variation in the branching pattern prevents serious surgical complication during surgeries of root of neck and superior mediastinum[9]. In most cases such anomalies are often unnoticed and happens to be an accidental finding.

**Conclusion**

The anatomical variations of arteries arising from the arch of the aorta are common. Surgeons must be aware of these variations during invasive procedures such as cardiac catheterization and tracheostomy.

**Declaration of conflict of interest**

The author has no conflict of interest to declare.

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