

## Case Report

# Anatomical variation in the origin of left vertebral artery: a case report

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### Abstract:

Presents work deals with description of anatomical variation in the left vertebral artery originating from the arch of aorta. This variation was in one of the cadaver in the department of Sharir Rachana at SDM College of Ayurveda Hassan, Karnataka (India). During routine dissection of a female cadaver of aged 60 years, in the superior mediastinum and root of the neck, atypical origin of the left vertebral artery was observed. Atypical origin compared to the typical origin of the left vertebral artery in the anatomical literature. Findings compared with different possible variations of the origin of the left vertebral artery reported in the literature.

**Key Words:** Vertebral Artery , Foramina Transversaria, Superior Mediastinum, Subclavian Artery

### Introduction:

The vertebral artery normally begins as the first branch of supero-posterior aspect of the subclavian artery. Vertebral arteries ascend in the neck to enter the cranial cavity to supply blood to the brain. These arteries pass through the foramina transversaria of upper six cervical vertebrae on both side and enter the cranial cavity through the foramen magnum .These arteries unite at lower border of the pons to form the basilar artery. This vessel goes along the ventral aspect of the brain stem [1]. The variation of the branches arising from the arch of aorta is well known & documented by many authors [2].

### Case report:

During the routine dissection in the department of Sharir Rachana at SDM College of Ayurveda Hassan, Karnataka, India , an anatomical variation of the origin of the left vertebral artery was observed in the 60 years old female cadaver. In the dissection of the superior mediastinum we were separating the branches of arch of aorta. We observed all branches of arch of aorta starting from right to left. The first brachiocephalic trunk with two branches right common carotid artery & right subclavian artery, the second branch-left common carotid artery were cut.

Two more arteries were examined. Out of these most left side artery identified as left subclavian artery and another artery, which was present right side to left subclavian artery, was entering in root of the neck. After dissecting the root of the neck, the artery was passing through the foramina

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transversaria of the fifth cervical vertebra on the left side. By comparing this finding to the literature, there was an anatomical variation in the origin of left vertebral artery. (Fig-1)

Right vertebral artery traced after dissecting the right side of the root of neck. The right vertebral artery was entering in sixth foramina transversaria of cervical vertebrae. Few pictures of structure in the superior mediastinum with all branches of arch of aorta & root of the neck taken including anatomical variation of the origin of left vertebral artery. In present case, the arch of aorta had four branches arising from the superior surface. The aortic arch was giving origin to the left vertebral artery which was located between the origin of left common carotid artery and left subclavian artery and entering in the foramina transversaria of the fifth cervical vertebrae on the left side.

#### **Discussion:**

In the typical pattern three branches arise from the arch of aorta and they are: brachiocephalic trunk, left common carotid artery and left subclavian artery. However, in approximately 6% of the population the left vertebral artery arises from the arch of aorta, usually between left common carotid and left subclavian artery[3]. The right vertebral artery can arise from the first part of the right subclavian artery (1% cases), directly from the arch of aorta (3%), from right common carotid artery or from brachiocephalic trunk[4]. The left vertebral artery may arise directly from the left common carotid artery, from the root of the left subclavian artery, and may arise from the arch of aorta. According to few research studies the frequency of origin of the left vertebral artery from the aortic arch was 5.6%[5]. The left vertebral artery can enter the foramina transversaria in the second to seventh cervical vertebra. The left vertebral artery usually enters the sixth cervical foramina transversaria (88%), only in 57% cases the left vertebral artery will enter seventh or fifth cervical vertebra[4].

The present case discusses the origin of the left vertebral artery arising from the upper surface of the arch of aorta and it was located between the origins of the left common carotid and left subclavian arteries. In

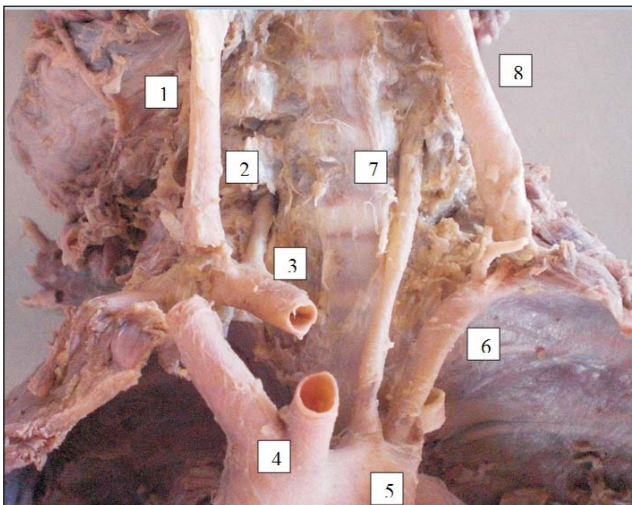
cases where the left vertebral artery arises from the arch of the aorta between the left common carotid artery and the left subclavian artery, it generally enters the foramen transversaria of C4C5 rather than sixth cervical vertebra[6]. It is observed that the atypical branching of the arch of aorta and there were no other variations or anomalies found. The left vertebral artery in our case entered C5 foramen transversarium. Normally first part of vertebral artery develops from dorsal division of 7th intersegmental artery which itself forms proximal part of left subclavian artery<sup>7</sup>. The 6th intersegmental artery and its dorsal division usually disappear as does the segment of dorsal aorta. In the present case, where vertebral artery arises from aortic arch, we feel that dorsal branch of 6th intersegmental artery may be making role in the development of first part of the vertebral artery instead of left 7th intersegmental artery hence, blood flows through these persists forming a vertebral artery of aortic arch origin.

According to the literature, most patients with anatomic variation of the left vertebral artery are clinically asymptomatic. Some patients complained of dizziness, but this was thought to have no association to the anomalous origin of the left vertebral artery. The most important benefit of detecting variations in the origin of the left vertebral artery and other arteries is diagnostic improvements before vascular surgeries of supra aortic arteries. The knowledge of potential left vertebral artery origin variants is necessary and beneficial for planning aortic arch surgery or endovascular interventions[6]. Variation knowledge is also important in the era of carotid artery stents, vertebral artery stents, and new therapeutic options for intracranial interventions.

#### **Conclusion:**

Anomalous origin of left vertebral artery was found from upper surface of the arch of aorta between the origins of the left common carotid and left subclavian artery which was entered C5 foramen transversarium. In angiography, endovascular surgery and head and neck surgery,

Figure 1. Anterior view of the dissected structures in superior mediastinum.



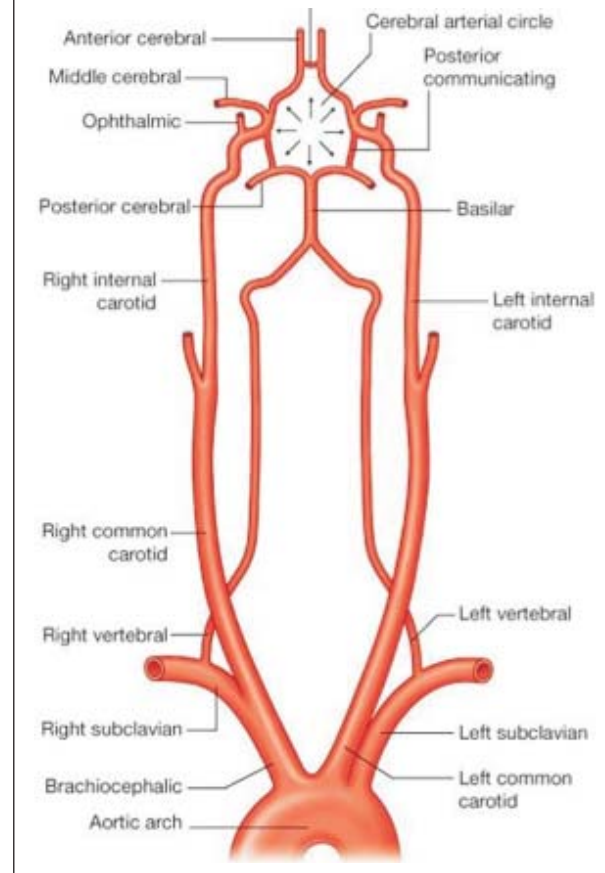
- 1) Rt. Common Carotid Artery
- 2) Rt. Vertebral Artery
- 3) Rt. Subclavian Artery
- 4) Brachiocephalic trunk
- 5) Arch of aorta
- 6) Lt. Subclavian Artery
- 7) Lt. Vertebral Artery
- 8) Lt. Common Carotid Artery

including that of the cervical spine, it is important to know and to understand uncommon anomalous variation of the vertebral arteries since this can allow physicians to avoid accidental damage to the vertebral arteries during these procedures. Furthermore, it can aid their understanding of hemodynamic, save time, and conserve contrast media during angiographic catheterization.

#### References:

- [1] Singh Inderbir. Textbook of Anatomy.5th edition. New Delhi: Jaypee brothers Medical Publishers(P)Ltd;2011:Vol 3; 850
- [2] Nayak SR, Pai MM, Prabhu LV, D'Costa S, Shetty P. Anatomical organization of aortic arch variations in the India: embryological basis and review. J Vasc Bras. 2006; 5: 95100.
- [3] Koenigsberg RA, Pereira L, Nair B, McCormick D, Schwartzman R. Unusual vertebral artery origins: examples and related pathology. Catheter Cardiovasc Interv. 2003; 59: 244250.
- [4] Kubikova E, Osvaldova M, Mizerakova P, El Falougy H, Benuska J. A variable origin of the vertebral artery. Bratisl Lek Listy. 2008; 109: 2830.
- [5] Yamaki K, Saga T, Hirata T, Sakaino M, Nohno M,

Figure 2: Course of both vertebral arteries



- Kobayashi S, Hirao T. Anatomical study of the vertebral artery in Japanese adults. Anat Sci Int. 2006; 81: 100106.
- [6] Goray VB, Joshi AR, Garg A, Merchant S, Yadav B, Maheshwari P. Aortic arch variation: a unique case with anomalous origin of both vertebral arteries as additional branches of the aortic arch distal to left subclavian artery. AJNR Am J Neuroradiol. 2005; 26: 9395.
- [7] Singh Inderbir. Human Embryology. 10th edition. New Delhi: Jaypee brothers Medical Publishers (P) Ltd; 2014; 262