Case Report

Anomalous origin of the left vertebral artery: A case report

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1. Introduction

The vertebral arteries begin in the root of neck as first branches of the supero-posterior aspect of the subclavian arteries. The vertebral arteries ascend the neck to enter the cranial cavity to supply blood to the brain. The two vertebral arteries are usually unequal in size; the left is frequently larger than right one [1]. The vertebral arteries pass through the foramina transversia of the first six cervical vertebrae on both sides, penetrate the posterior atlanto-occipital membrane and enter the cranial cavity through the foramen magnum. Vertebral arteries unite at the caudal border of pons to form unpaired basilar artery. This vessel course along the ventral aspect of the brainstem[2]. The variations in the branches of arch of aorta are usually associated with abnormalities of the heart and persistent fetal conditions. These variant branches that arise from the aortic arch are due to the changes in the extend of the fusion process and absorption of some of the aortic arch in to aortic sac [3]. The number of branches that arise from the arch of aorta depend on such process.

Although, vertebral artery is classically described as first branch of the ipsilateral subclavian artery, multiple variations in the origin of that vessels have been reported in the literature. The vertebral artery can arise from the aortic arch, from the common, internal or external carotid arteries or from subclavian branches such as the thyrocervical trunk. Also they may have duplicate origins, generally from the aortic arch and subclavian artery. The left vertebral artery not infrequently arise from the aortic arch, with reported prevalence of 2.4-5.8% [4].When it originate from the arch, the left vertebral artery usually enters the transverse foramen of fourth or fifth cervical vertebra rather than the sixth [5].

Case report:

During routine dissection for undergraduate teaching, an anatomical variation of the origin of the left vertebral artery was observed in a 50 yr. old male cadaver. The thoracic cavity was opened and structures in the superior mediastinum were dissected. We observed all the branches of arch of aorta, starting from right to left; first branch as the right side located in the superior mediastinum was the brachiocephalic trunk with two branches-right common carotid artery and right subclavian artery. The second branch we found was the left common carotid artery and the third branch was the left subclavian artery. Between previously mention arteries on the left side, we observed an additional branch arising from the arch of aorta (fig.1 & 2). We discussed, observed and compare our findings to the literature and came to the conclusion, that we found an anatomical variation of the origin of the left vertebral artery. In our cadaver, the arch of aorta had four branches arising from its superior surface. The aortic arch was giving origin to the left vertebral artery, which was located between the origin of left common carotid and left subclavian arteries. No other congenital variations were found. The left vertebral artery in our case enters the fourth cervical foramen transversarium.
embryonic period; among the dorsal blood vessels of the 3rd aortic arch, the residual part forms the brachiocephalic trunk and the 4th aortic arch forms the normal adult type aortic arch [6]. Normally the first part of vertebral artery develops from the dorsal ramus of the seventh intersegmental artery. The left subclavian artery is only develops from the left seventh intersegmental artery. In cases where the vertebral artery arise as a branch from arch of aorta, embryologically it is explained that this is due to fact that vertebral artery develops from the persistent sixth cervical intersegmental artery and segment of dorsal aorta fail to disappear so blood flow through these persisting routes.

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 population the left vertebral artery arise from the arch of aorta, usually between left common carotid and left subclavian artery [7].

The right vertebral artery can arise from the first part of the right subclavian artery (1% cases), directly from the arch of aorta (3% cases), from right common carotid artery or from brachiocephalic trunk. In the Indian study 1.6% had left vertebral artery as a branch of aortic arch [8].

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% cases), only in 5-7% cases the left vertebral artery will enter seventh or fifth cervical vertebra [8].

Conclusion:
According to literature most patient with anatomic variations of left vertebral artery are clinically asymptomatic. Some patient 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 supraaortic arteries. The knowledge of potential left vertebral artery origin variants is necessary and beneficial for planning aortic arch surgery or endovascular interventions.

REFERENCES
