



INFREQUENT DIAGNOSIS OF THE LUSORY RIGHT VERTEBRAL ARTERY: REPORT OF TWO CASES AND THEIR CLINICAL IMPLICATIONS.

Ayurveda

**Larissa Pinho
Sampaio***

MD, Doctor Residing in Radiology, Department of Radiology of the Fortaleza General Hospital, Fortaleza-CE, Brazil. *Corresponding Author

**Sabino Rodrigues
de Oliveira Neto**

MD, Radiologist, Department of Radiology of the Fortaleza General Hospital, Fortaleza-CE, Brazil.

**Carlos Leite de
Macedo Filho**

MD, Radiologist, Department of Radiology of the Fortaleza General Hospital, Fortaleza-CE, Brazil.

**Francisco Barbosa
de Araújo Neto**

Radiologist, Department of Radiology of the Fortaleza General Hospital, Fortaleza-CE, Brazil

ABSTRACT

The right and left vertebral arteries originate, most commonly, from the corresponding subclavian arteries, without presenting a mediastinal path. The anomalous origin of the right vertebral artery is quite rare, with few cases described in the literature and, in general, it is an incidental finding in imaging studies. The vertebral artery with anomalous origin can present a retroesophageal path, and thus it can be called lusory right vertebral artery.

KEYWORDS

Vertebral artery; Anatomic Variation; Computed tomography.

Introduction

The vertebral arteries originate, most commonly, from the postero-superior aspect of the proximal segment of the corresponding subclavian arteries, following a cervical path through the foramen of the transverse processes from C1 to C6, without presenting a mediastinal path. Among the anomalous origins of these vessels, the most common is the left vertebral artery originating directly from the aortic arch, between the left common and subclavian carotid arteries, with a prevalence ranging from 2.4% to 5.8% and, in these cases, the vertebral artery usually enters the transverse foramen of C4-C5 instead of C6 1,6.

The anomalous origin of the right vertebral artery is less frequent, being quite rare, with few cases described in the literature. This variation can be divided into three categories: direct origin of the aortic arch, origin of the carotid or brachiocephalic arteries, duplicate origin. The vertebral artery with anomalous origin can present a retroesophageal mediastinal path, being called lusory vertebral artery 3.

Objective and Method

To describe two cases of right vertebral arteries with anomalous origins in the aortic arch and retroesophageal mediastinal pathways, being incidental findings in angiotomography exams.

Discussion

The aortic arch appears as a continuation of the ascending aorta, being oriented most commonly from anterior to posterior and from right to left. In 70% of cases, it has three branches: brachiocephalic trunk, left common carotid artery and left subclavian artery.

The anatomical variants of the aortic arch result from an abnormal segmental arterial interruption during embryogenesis, and some of them may be associated with congenital malformations and even cause compression on adjacent structures, such as the trachea and esophagus 3.

Among the numerous anatomical variants, one of the most common is the right subclavian artery as the last branch of the aortic arch and describing a retroesophageal pathway, which can cause esophageal compression, characterizing lusory dysphagia. The anatomical variants involving the vertebral arteries are less frequent and, when these vessels have a direct origin in the aortic arch in addition to a retroesophageal path, we can call them the lusory vertebral artery 3.

The diagnosis of anomalous vertebral artery is most commonly done incidentally, as the vast majority of patients are asymptomatic. However, this anatomical variation may represent an independent risk factor for arterial dissection and coarctation of the thoracic aorta 2,3.

The extra-cranial path of the vertebral artery can lead to increased vulnerability of the vessel wall to shear stress, resulting in rupture and dissection of the intima layer 4.

In patients who will be submitted to cervical or cardiothoracic endovascular and surgical procedures, diagnosis of the anomalous origin and path of the vertebral artery becomes essential, since it can prevent iatrogenic injury to these vessels during the operation 4,5.

Conclusion

The right vertebral artery originating in the aortic arch and describing a retroesophageal pathway is a rare anatomical variation, with few cases described in the literature.

The identification of the anomalous origin and path of this vessel becomes important, especially before endovascular procedures or cardiothoracic surgery. Failure to identify an anomalous vertebral artery can lead to vascular injury, with a consequent increase in intraoperative morbidity and mortality in these patients 5.

Images/Cases and Legends

Figure 1 (Case 1): Axial oblique tomographic section showing the right vertebral artery originating from the right medial side of the posterior knee of the aortic arch, describing a path posterior to the esophagus and trachea.

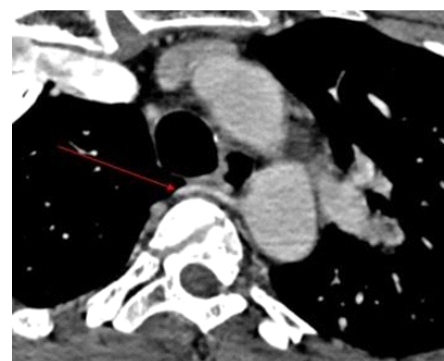


Figure 2 (Case 1): Reformatted tomographic sections (MIP), coronal oblique (A and B) and sagittal oblique (C), showing origin (red arrow in A) and paravertebral path of the lusory vertebral artery (yellow arrow in B), observing the passage of the artery in the space between the first costal arch and the right transverse process of D1 (blue arrows in C), following its cranial path through the transverse processes of the cervical vertebral bodies, from C7.



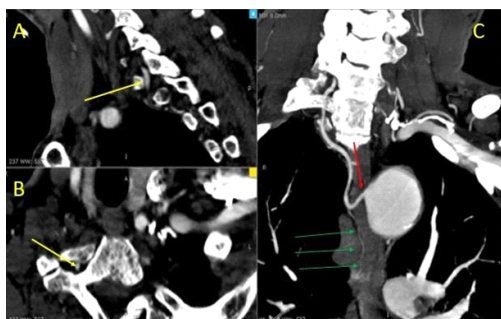
Figure 3 (Case 1): Sagittal MIP (A), axial (B) and coronal MIP (C) reformatted tomographic sections oblique, showing path of the right lusory vertebral artery between the right transverse process of D1 and the first right costal arch (red arrows).



Figure 4 (Case 2): Lusory right vertebral artery originating from the aortic arch (red arrow) describing a path posterior to the esophagus (yellow arrow) and trachea (blue arrow).



Figure 5/Case 2: Lusory right vertebral artery originating in the aortic arch (red arrow in C), describing a path posterior to the esophagus and trachea, ascending in the right paravertebral region, between the transverse-costal and costo-vertebral joints of D1 (blue arrow in B), and from there through the transverse processes of the cervical vertebral bodies, from C7 (blue arrow in A). Observe a small descending branch starting from the vertebral artery, irrigating the esophagus (green arrows in C).



References

- 1- Liu, Y., Li, Z., & Fu, J. (2017). A rare anomalous origin of right vertebral artery with double branch: first case report. *Interventional Neuroradiology*, 0(00), 1-4.
- 2- Baek, S. H., & Baek, H. J. (2014). Aberrant right vertebral artery originating from the aortic arch distal to the left subclavian artery: a case report. *J Korean Soc Radiol*, 70(3), 191-94.
- 3- Lacout A., Khalil A., Figl A., Liloku R., & Marcy, P. Y. (2012). Vertebral arteria lusoria: a life-threatening condition for oesophageal surgery. *Surg Radiol Anat*, 34, 381-83.
- 4- Yuan S. M. (2016). Aberrant origin of vertebral artery and its clinical implications. *Braz J Cardiovasc Surg*, 31(1), 52-9.
- 5- Saeed U. A., Gorgos A. B., Semionov A., & Sayegh K. (2017). Anomalous right vertebral artery arising from the arch of aorta: report of three cases. *Radiol Case Rep*, 1(2), 13-8.

- 6- Goray, V. B., Joshi, A. R., Garg, J. A., Merchant, S., Yadav, B., & Maheshwari, P. (2005). 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. *Am J Neuroradiol*, 26, 93-5.