A rare case of aberrant origin of left and right vertebral artery from double aortic arch

Dou Yuan[1] and Zhuo Ma Xiong Qiu[2]

[1]West China Hospital of Sichuan University
[2]West China Hospital of Medicine

October 3, 2023

A rare case of aberrant origin of left and right vertebral artery from double aortic arch

Zhuoma Xiongqiu[1], Dou Yuan[2#].

[1] Department of Pediatric Intensive Care Unit, West China Hospital, Sichuan University, Guoxuexiang 37th, 610041 Chengdu, Sichuan, P.R. China.

[2] Department of Cardiovascular Surgery, Cheng Du Shang Jin Nan Fu Hospital, West China Hospital of Sichuan University,Chengdu 610041, Sichuan Province, China.

[#] Correspondence: Dou Yuan,, Chengdu, Sichuan, 610041, People's Republic of China; fax: + 86 28 85422897; e-mail:*yuandou123456789@aliyun.com* .

A rare case of aberrant origin of left and right vertebral artery from double aortic arch

Zhuoma Xiongqiu[1], Dou Yuan[2#].

[1] Department of Pediatric Intensive Care Unit, West China Hospital, Sichuan University, Guoxuexiang 37th, 610041 Chengdu, Sichuan, P.R. China.

[2] Department of Cardiovascular Surgery, Cheng Du Shang Jin Nan Fu Hospital, West China Hospital of Sichuan University,Chengdu 610041, Sichuan Province, China.

[#] Correspondence: Dou Yuan,, Chengdu, Sichuan, 610041, People's Republic of China; fax: + 86 28 85422897; e-mail:*yuandou123456789@aliyun.com* .

Key Clinical Message

Double aortic arch (DAA) is a exceedingly rare congenital vascular anomaly and rarely with anomalous origin of vertebral artery, Enhanced CT should be considered in DAA patients to identify the anomalous origin of branch arteries. it is not only aid in surgical planning but also deepen our comprehension of potential embryological variations in aortic arch development.

KEYWORDS

Double aortic arch; vertebral artery; enhanced CT.

A 3-year-old girl with a history of respiratory distress was referred to emergency department, The patient was afebrile on initial evaluation with a heart rate of 110, blood pressure of 75/40 mmHg, and an oxygen saturation of 99% on room air. no wheezing, crackles were present on the auscultation of the lungs, and EKG showed normal sinus rhythm. Chest x-ray showed tracheal indentation and suspicion of tracheal stenosis. Echocardiography was not conclusive but raised the possibility of Double aortic arch (DAA) .

She was therefore referred for cardiac enhanced CT. The result revealed a DAA with arch origins for left common carotid, left vertebral, and left subclavian on the left , and right common carotid, right vertebral, and right subclavian arteries on the right(figure 1A and 1B).The girl subsequently underwent division of the left arch, distal to the origin of the left subclavian artery to relieve the vascular compression on the trachea. Postoperative recovering was uneventful.

Double aortic arch (DAA) is a exceedingly rare congenital vascular anomaly, with one in 15,000 births accounting for only 1% of all congenital heart diseases[1]. This disease is the most common type of complete vascular ring, which easily compresses the trachea and/or esophagus to cause A spectrum of signs and symptoms such as dysphagia, vomiting, respiratory distress, wheezing, and stridor[2]. Vertebral artery (VA) typically emanates from the supero-posterior aspect of the 1st part of the subclavian artery and Variations of the VA origin usually occur in the congenital heart disease[3]. We herein report a double aortic arch, with arch origins for left common carotid, left vertebral, and left subclavian on the left , and right common carotid, right vertebral, and right subclavian arteries on the right . To our knowledge, a DAA with a direct aortic origin of the right and left VA from two arches have not been reported.

Therefore Enhanced CT should be considered in DAA patients to identify the anomalous origin of branch arteries, because noninvasive cardiovascular imaging have unveiled rare variations in aortic arch and such insights not only aid in surgical planning but also deepen our comprehension of potential embryological variations in aortic arch development.

AUTHOR CONTRIBUTIONS

All authors were involved in the conception and design, critical revision, manuscript writing, final approval, and agreed to be accountable for all aspects of the work.

FUNDING INFORMATION

No funding was required in the preparation of this case report.

DATA AVAILABILITY STATEMENT

All data generated or analyzed during this study are included in this published article.

ETHICS STATEMENT

This study is in compliance with the declaration of Helsinki.

CONSENT

Written informed consent was obtained from the patient for publication of this case report in accordance with the journal's patient consent policy.

REFERENCES

1. Bartsota M, Jowett V, Manuel D, et al. Double aortic arch: implications of antenatal diagnosis, differential growth of arches during pregnancy, associated abnormalities and postnatal outcome. *Ultrasound Obstet Gynecol* . 2023;62(1):69-74.
2. Biermann D, Hazekamp MG. Vascular ring surgery: future trends and challenges in diagnosis and treatment. *Eur J Cardiothorac Surg* . 2022 May 27;61(6):1269-1270.
3. Lazaridis N, Piagkou M, Loukas M, et al. A systematic classification of the vertebral artery variable origin: clinical and surgical implications. *Surg Radiol Anat.* 2018 ;40(7):779-797.

FIGURE 3D contrast-enhanced CT: (1A) left sagittal view, showing the left common carotid artery (LCCA), left vertebral artery (LVA), and left subclavian artery (LSCA) on the left aortic arch (LAA), as well as the (B) right sagittal view, showing right common carotid artery (RCCA), right vertebral artery (RVA), and right subclavian artery (RSCA) on the right aortic arch.