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Clinical Image

From Chest X-Ray to CT: Diagnosing Right Aortic Arch with Kommerell´s Diverticulum

Humberto Morais [1, 2], Miguel Vicente [3, 4], Tshimbalanga Merite [1], Mauer Alexandre da Ascensão Gonçalves [1, 5]

[1] Advanced Studies Center in Medical Education and Training (CEDUMED), Faculty of Medicine, Agostinho Neto University, Luanda, Angola.
[2] Main Military Hospital / Higher Institute, Luanda, Angola.
[3] Cardiology Department, Coimbra Hospital and University Centre, Coimbra, Portugal.
[4] Cardiovascular and Thoracic Centre, Clínica Girassol, Luanda, Angola.
[5] Luanda Medical Center, Luanda, Angola.

* Correspondence: mauergoncalves@gmail.com.

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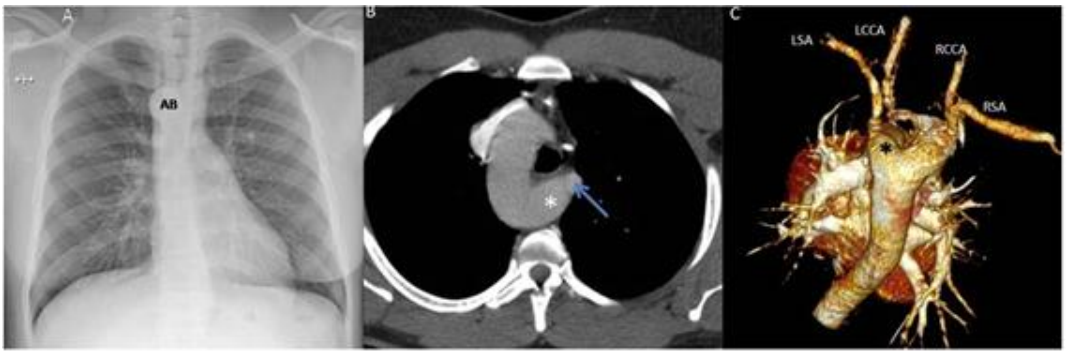

Figure 1: A. Posteroanterior (PA) chest radiograph revealing the right aortic button. B. Contrast-enhanced computed tomography (axial plane, mediastinal window) revealing the right aortic arch, Kommerell's diverticulum (asterisk), and aberrant left subclavian artery (arrow). C. Volume rendering (posterior view) confirms the diagnosis and reveals the emergence of the remaining supra-aortic vessels from the right aortic arch. AB - Aortic button; LCCA - Left common carotid artery; LSA - Left subclavian artery; RCCA - Right common carotid artery; RSA - Right subclavian artery.

A 33-year-old black male bank clerk with uncontrolled hypertension was admitted to an outpatient cardiology clinic due to episodes of hypertensive crisis while at work. A chest X-ray showed an aortic knob on the right (Figure 1A). A contrast-enhanced computed tomography scan was requested, which revealed a right aortic arch and Kommerell's diverticulum (24mm), from which the aberrant left subclavian artery emerges (Figures 1B and C). The remaining supra-aortic vessels emerge from the right aortic arch (Figure 1C). The right aortic arch is a rare congenital anomaly of the aorta resulting from an embryonic alteration characterized by the regression of the fourth left aortic arch. First described in 1763 by Fioratti and Aglietii, it occurs in approximately 0.05% of the population [1, 2]. In about 50% of cases, it is associated with an aberrant left subclavian artery (lusoria), of which 80% runs posterior to the esophagus, 15% between the trachea and

esophagus, and 5% anterior to the trachea. Its variable relationship with Kommerell's diverticulum has an incidence ranging from 0.04% to 0.1%, causing varying degrees of extrinsic compression of these structures [2].

In asymptomatic patients, the natural history of the condition is not fully understood, but several key points are important: 1) Slow and asymptomatic progression: many cases remain stable over time without significant progression; 2) Risk of aneurysmal growth: studies suggest that dilation may progress, reaching critical sizes, which increases the risk of dissection or rupture; it was observed that hypertension was associated with more rapid aneurysm growth. 3) Progressive compression of adjacent structures: even without initial symptoms, the diverticulum's growth may lead to compression of the esophagus or trachea, resulting in dysphagia lusoria (difficulty swallowing) or respiratory symptoms (dyspnea, stridor, cough, recurrent pneumonia, obstructive emphysema), chest pain, and regurgitation [2, 3].

Surgery or endovascular stenting is indicated for symptomatic patients or when the diverticulum reaches ≥30 mm in diameter due to the increased risk of dissection or rupture. For asymptomatic patients, annual imaging surveillance with CT angiography or magnetic resonance angiography is recommended to assess growth and the risk of complications [3, 4]. In the present case, the finding was incidental, mainly because the patient had never developed symptoms due to a non-obstructive/compressive variant of this association. Antihypertensive medication was adjusted, and the patient remains symptom-free. The significance of this case lies in its clinical context: an asymptomatic hypertensive patient undergoing a routine health examination, where the simplest imaging modality, the chest X-ray, served as a valuable diagnostic tool.

In conclusion, although the chest X-ray remains a valuable tool for initial evaluation, computed tomography (CT) is essential for the diagnosis and management of vascular anomalies. CT provides high-resolution images and three-dimensional reconstructions that allow detailed visualization of the aorta and its branches, facilitating the identification of aneurysms, stenoses, dissections, and congenital malformations. Furthermore, it enables accurate assessment of lesion extent and early detection of complications, proving fundamental in both therapeutic planning and the monitoring of asymptomatic patients or those under post-treatment follow-up.

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Conflicts of Interest: None.

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