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Radiology

A Rare Case of Right Aortic Arch, Evaluation Using CT

S. Auhmani[1*], S. Taoufiki[1], B. Slioui[1], H. Doulhousne[1], S. Bellasri[1], N. Hammoune[1], A. Mouhcine[1]

[1]Radiology Department, Avicenne Military Hospital, Marrakech, Morocco

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***Corresponding author:** S. Auhmani
Radiology Department, Avicenne Military Hospital, Marrakech, Morocco

Abstract **Case Report**

This case report discusses a 76-year-old male with a right aortic arch and an aberrant retroesophageal left subclavian artery, identified during a CT scan. The imaging revealed Kommerell's diverticulum without affecting the pulmonary trunk. Classified as type II, this variant emphasizes the role of CT in diagnosing congenital thoracic aortic anomalies, often missed by echocardiography.

Keywords: Aortic Arch, Evaluation, CT scan, pulmonary trunk, echocardiography.

INTRODUCTION

Thoracic aorta's malformations are rare and often discovered incidentally in adulthood. Thoracic angioscan is the examination of choice for diagnosing malformations of the thoracic aorta and its branches. A right aortic arch is a rare anatomical variant of the thoracic aorta, caused by a defect in the regression mechanism of the branchial arches during embryogenesis [1]. This anatomical variant of the thoracic aorta occurs in around 0.1% of the adult population [2]. It may be associated with an aberrant left subclavian artery arising from a diverticulum of Kommerell. This association is generally asymptomatic and diagnosed incidentally in adulthood [3]. Despite its rarity, this association remains the most frequent anomaly of the aortic arch described in the literature.

CASE DESCRIPTION

A 76-year-old male patient was admitted to the imaging department of the Avicenne Military Hospital in Marrakech for a thoracic CT scan as part of an extension assessment of his recently diagnosed prostate adenocarcinoma.

The protocol consisted of an initial thoracic volume acquisition with injection of iodinated contrast medium at arterial time using automatic contrast detection software (bolus) with the region of interest (ROI) positioned at the level of the pulmonary artery trunk. The iodinated contrast medium used was Télébrix 35® 300mg/ml.

A volume of 70 ml was injected at a speed of 4 ml/s using an automatic injector.

The images were processed using dedicated software.

RESULTS AND DISCUSSION

The angioscan confirmed the right position of the aortic arch and the descending thoracic aorta. It also revealed an aberrant retroesophageal left subclavian artery arising from a diverticulum of Kommerell (Figure 1 and 4). There was no change in the position or morphology of the pulmonary trunk.

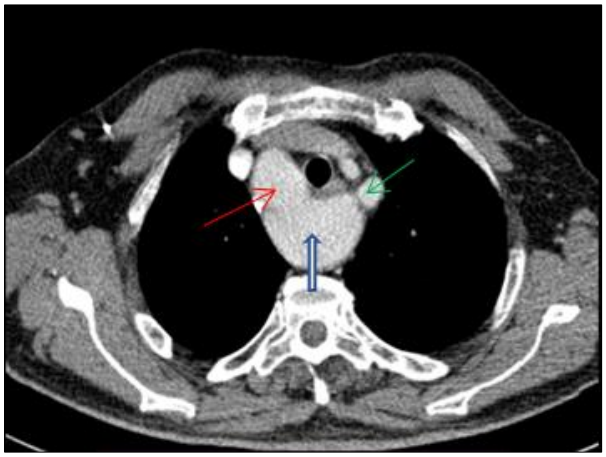
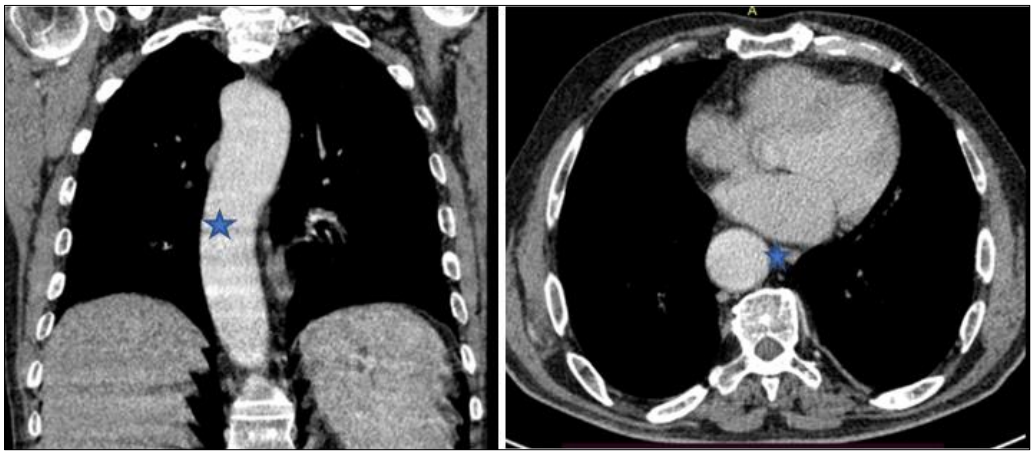


Figure 1: Axial CT arterial phase through T4. Thoracic aortic arch on the right (red arrow), Kommerell's diverticulum (hollow arrow), left subclavian artery (green arrow).



Figures 2 and 3: Frontal and axial reconstruction. Right descending thoracic aorta (star)

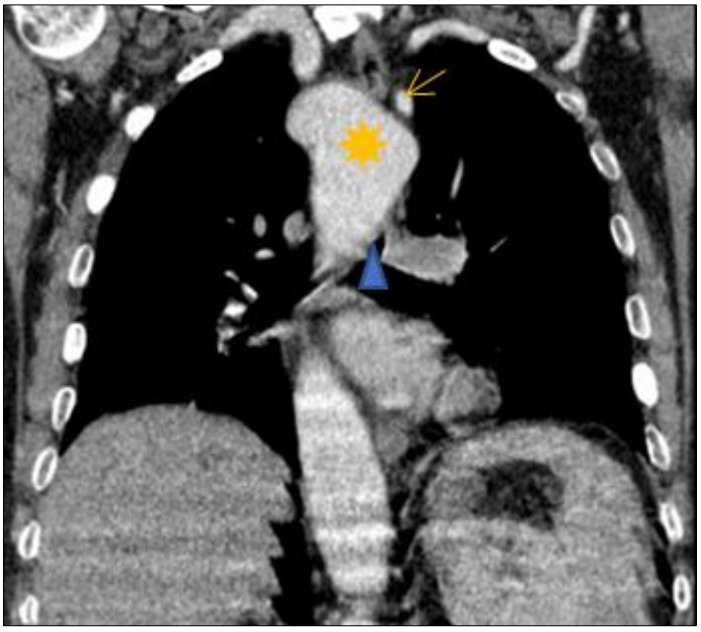


Figure 4: Frontal reconstruction. Kommerell's diverticulum (sun), left subclavian artery (yellow arrow), oesophagus compressed by Kommerell's diverticulum (blue arrowhead)

The right thoracic aorta was first documented by Fioratti and Aglietti in 1763 [4]. It is classified into three types by Edwards:

- Type I characterised by a right thoracic arch with mirror-like branches (this type is strongly associated with congenital heart disease)
- Type II with a right aortic arch with an aberrant subclavian artery that may arise from a remnant of the right dorsal artery known as Kommerell's diverticulum
- Type III which associates a right aortic arch with an isolated left subclavian artery [3].

Type I accounts for 59% of all right aortic arches, type II 39.5% and type III 0.8% [2]. The two cases presented in this study were classified as type II.

The patient presenting with a right aortic arch with aberrant subclavian artery is usually symptomatic and there is no particular association with cardiac abnormalities. However, most symptoms are due to atherosclerotic changes in the abnormal vessels, dissection, or aneurysm with compression of adjacent structures, particularly the oesophagus, causing dysphagia lusoria and dyspnoea [5, 6]. In the case reported, there were no symptoms associated with the vascular variations observed.

The aberrant left subclavian artery usually arises from a diverticulum of Kommerell.

The diverticulum is defined as a conical dilatation of the proximal part of an aberrant subclavian artery near its origin in the aorta [1-7]. The diverticulum results from only partial regression of the primitive 4th aortic arch, thus still forming part of the base of the left subclavian artery.

CONCLUSIONS

Congenital anomalies of the thoracic aorta and its branches are rare and varied, and sometimes asymptomatic.

They certainly benefit from the contribution of cross-sectional imaging, in particular CT and MRI, which complement the inadequacies of echocardiography, avoid angiography and provide a complete morphological assessment.

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