

A rare association: Type B aortic dissection in a patient with aortic coarctation

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Section: Cardiovascular

Area of Interest: Arteries / Aorta

Procedure: Diagnostic procedure

Imaging Technique: CT

Imaging Technique: CT-Angiography

Special Focus: Dissection Case Type: Clinical Cases

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Patient: 62 years, male

Clinical History:

A 62-year-old male patient was referred to our institution with the diagnosis of type B aortic dissection (AD).

The patient had a medical history of arterial hypertension, ischaemic cardiopathy and chronic obstructive pulmonary disease. There was no known hereditary diseases or previous invasive aortic procedures.

Imaging Findings:

In order to further evaluate the case and consider the adequate therapeutic approach we performed a Computed Tomography Angiography (CTA).

The CTA showed a marked focal narrowing in the initial segment of the thoracic descending aorta, features of a post-ductal aortic coarctation (AC).

A Stanford type B aortic dissection (AD) was also detected just distal to the coarctation site extending to the left common iliac artery. Parietal thrombosis could be seen along the false lumen.

As a result of the chronic narrowing of the aortic lumen there were multiple collateral vessels to allow the flow of blood to the post-coarctation part of the descending aorta, which included internal thoracic, intercostal and vertebral arteries.

Discussion:

AC consists in a segmental narrowing of the distal arch or descending aorta. [1] There are two AC types: the pre-ductal type, an uncommon form seen in neonates, with aortic stenosis located above the left subclavian artery and associated with an hypoplastic arch; the post-ductal type (more frequent) is characterised by abrupt stenosis of a focal segment of the descending aorta, distal to the left subclavian artery. [1]

AD results from the separation of the aortic wall layers, when a tear in the intima allows the blood to enter the intima-media space, creating a blood-filled false lumen. [2] Stanford classification systems divide dissections according to the involvement of the ascending aorta: type A involves the ascending aorta and type B starts distal to the brachiocephalic vessels. [3]

AC is a known risk factor to type A aortic dissection, as it causes upper body hypertension and ascending aorta dilatation. [4] However, the association between type B aortic dissection with AC is rare, because blood pressure

and arterial wall tension is reduced distal to the coarctation. [4, 5] The majority of these cases have iatrogenic aetiology (after surgical or endovascular aortic procedures), with only a few reported cases of spontaneous dissection (most of them associated with connective tissue abnormalities of the aortic wall and poststenotic dilatation of the descending aorta). [4]

Although conventional angiography and magnetic resonance are capable of detecting and delineating AC and AD, nowadays, CTA has become the first-line imaging technique in the evaluation of these pathologies, because of its availability, speed, and multiplanar reformatting capabilities.

The classic features of AD are an intimal flap and false lumen. [2] Unenhanced scans can show high-attenuation of an acutely thrombosed false lumen, internal displacement of intimal calcification and mediastinal or pericardial haematoma. Delayed enhancement of the false lumen, mural thickening with increased attenuation, and irregular compression of the true lumen by an expanding intramural haematoma or thrombus are features that can also be seen in aortic dissection. If aortic branch vessels are supplied from the false lumen, organ ischaemia or infarction can occur. [2]

In AC, CTA with multiplanar reformations allows an easy detection of the focal narrowing of the aorta and characterisation of the type of coarctation, degree of narrowing and the presence of any arterial thrombus. [1, 5]

Other important findings are the presence of collateral arteries. [1]

The treatment of the few cases described in the literature is surgical. [4, 5] CTA allows prompt diagnosis and characterisation of the aorta, permitting optimal therapeutic management.

Differential Diagnosis List: Type B aortic dissection with aortic coarctation, Intramural haematoma, Penetrating atherosclerotic ulcer, Pseudo-coarctation

Final Diagnosis: Type B aortic dissection with aortic coarctation

References:

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Figure 1

a



Description: CTA maximum intensity projection coronal reconstruction depicting the Stanford type B aortic dissection. **Origin:** Hospital de Santa Maria

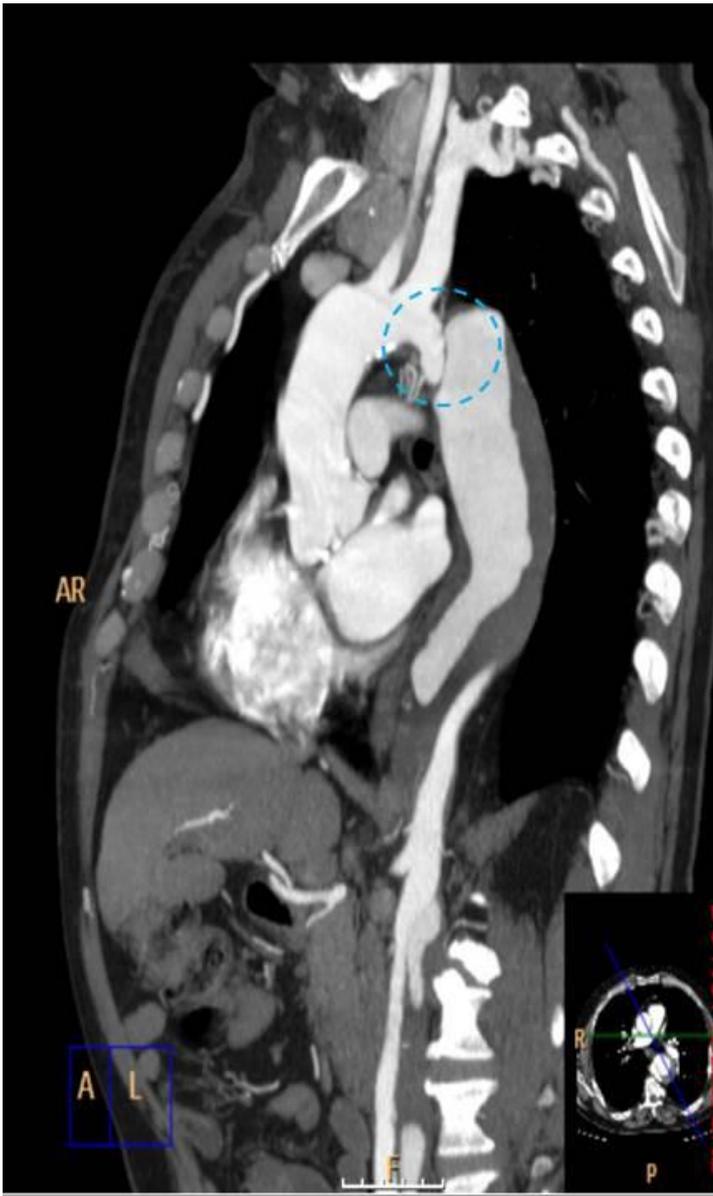
Figure 2

a



Description: CTA maximum intensity projection sagittal reconstruction showing a marked focal narrowing of the thoracic aorta immediately after left subclavian artery origin. A Stanford type B aortic dissection is seen distal to the coarctation. **Origin:** Hospital de Santa Maria

b



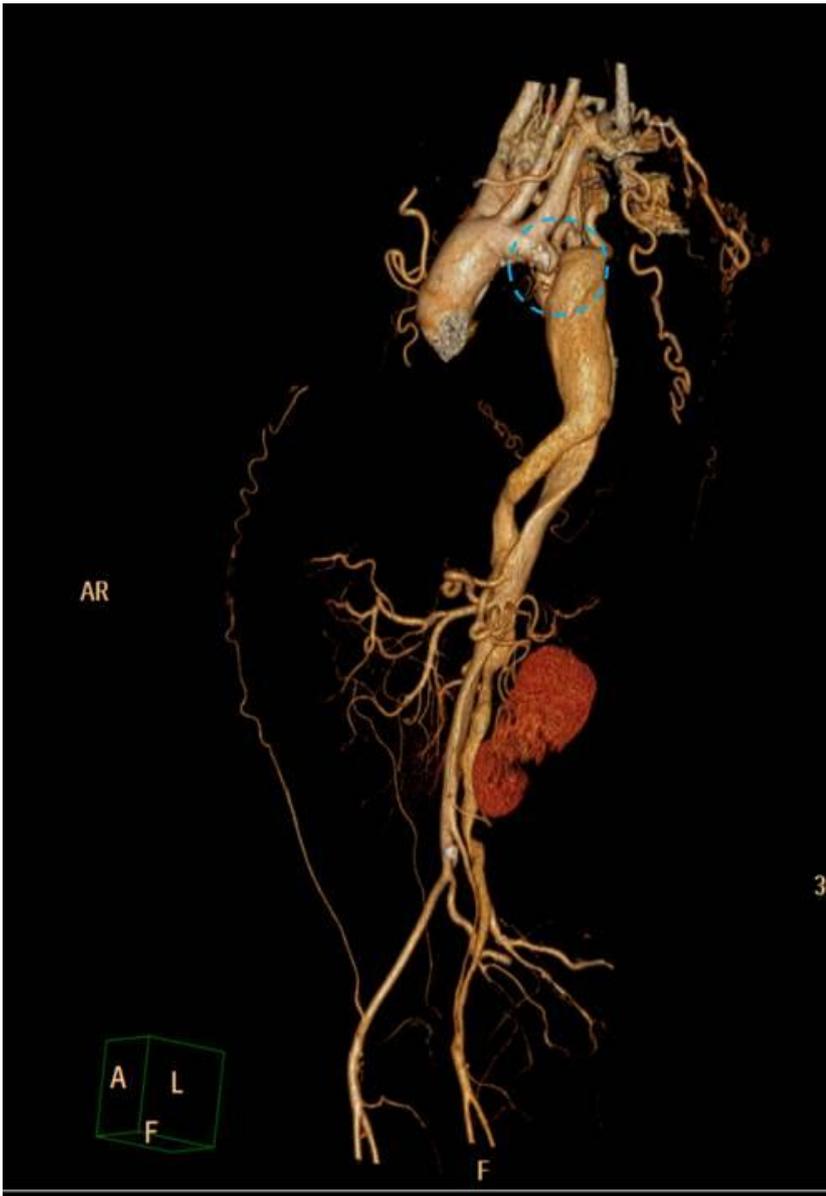
Description: CTA maximum intensity projection sagittal reconstruction showing a marked focal narrowing of the thoracic aorta immediately after left subclavian artery origin (circle). A Stanford type B aortic dissection is seen distal to the coarctation. **Origin:** Hospital de Santa Maria

C



Description: CTA tridimensional reconstruction showing a marked focal narrowing of the thoracic aorta immediately after left subclavian artery origin. A Stanford type B aortic dissection is seen distal to the coarctation. **Origin:** Hospital de Santa Maria

d



Description: CTA tridimensional reconstruction showing a marked focal narrowing of the thoracic aorta immediately after left subclavian artery origin (circle). A Stanford type B aortic dissection is seen distal to the coarctation. **Origin:** Hospital de Santa Maria

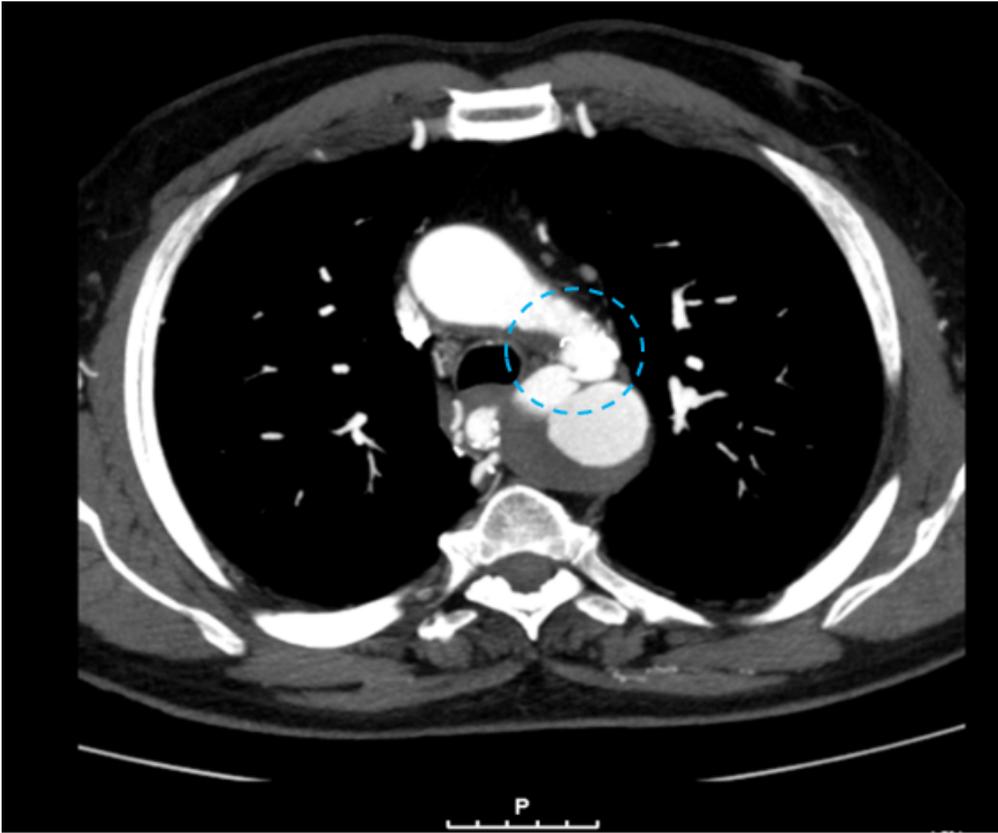
Figure 3

a



Description: CTA maximum intensity projection axial reconstruction showing a marked focal narrowing of the thoracic aorta immediately after left subclavian artery origin. A Stanford type B aortic dissection is seen distal to the coarctation. **Origin:** Hospital de Santa Maria

b



Description: CTA maximum intensity projection axial reconstruction showing a marked focal narrowing of the thoracic aorta immediately after left subclavian artery origin (circle). A Stanford type B aortic dissection is seen distal to the coarctation. **Origin:** Hospital de Santa Maria

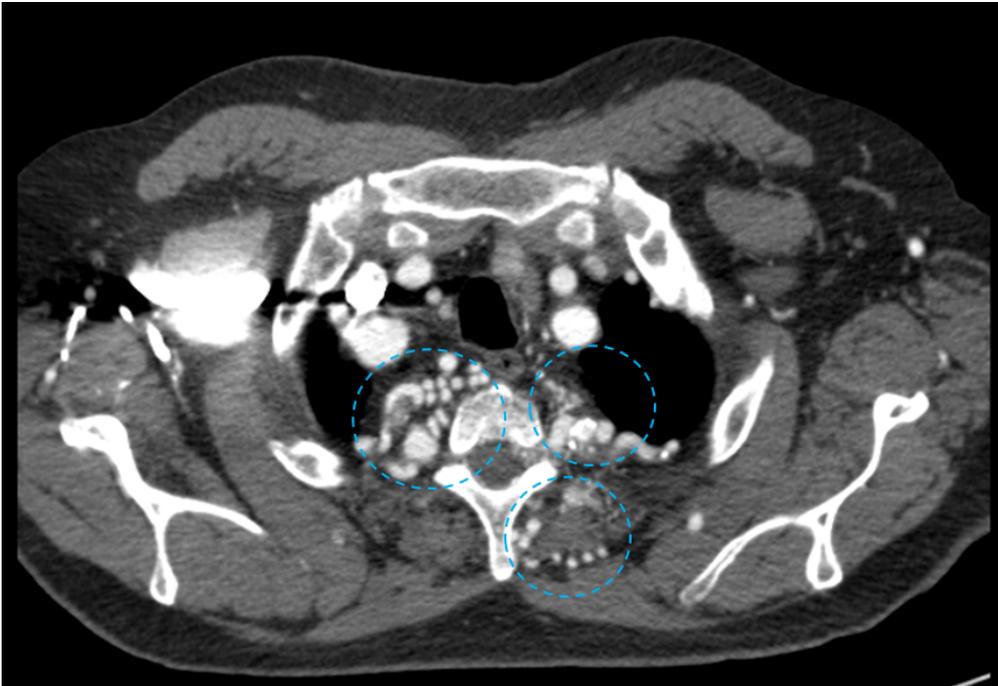
Figure 4

a



Description: CTA maximum intensity projection axial reconstruction illustrating an extensive network of collateral vessels allowing the flow of blood from high to low pressure zones via spinal and intercostal arteries. **Origin:** Hospital de Santa Maria

b



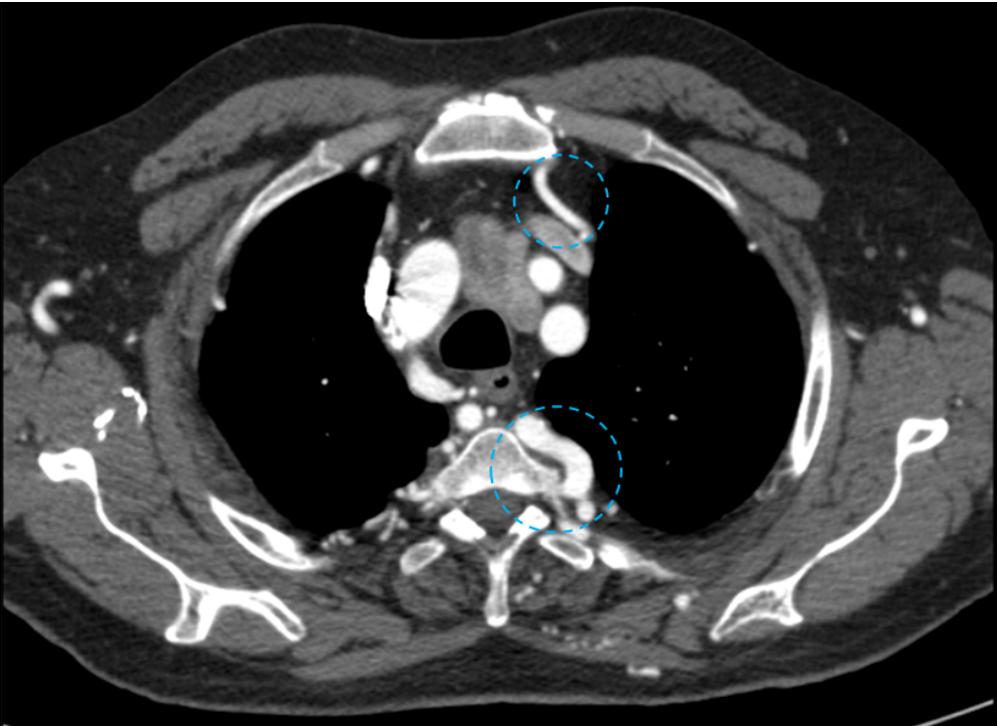
Description: CTA maximum intensity projection axial reconstruction illustrating an extensive network of collateral vessels allowing the flow of blood from high to low pressure zones via spinal and intercostal arteries (circles). **Origin:** Hospital de Santa Maria

c



Description: CTA maximum intensity projection axial reconstruction illustrating an extensive network of collateral vessels allowing the flow of blood from high to low pressure zones via internal thoracic and intercostal arteries. **Origin:** Hospital de Santa Maria

d



Description: CTA maximum intensity projection axial reconstruction illustrating an extensive network of collateral vessels allowing the flow of blood from high to low pressure zones via internal thoracic and intercostal arteries (circles). **Origin:** Hospital de Santa Maria