

Extensive Takayasu Arteritis

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History

A 43-year-old female patient, complaining of chest tightness and shortness of breath upon exertion, was admitted to our hospital. The symptoms began a year ago and had aggravated over the past 10 days. The patient had a history of hypertension for the past five years. Physical examination revealed a blood pressure difference of 25 mmHg between the right and left arms (165/82 mmHg vs. 140/85 mmHg). Crepitant rales in the thoracic aorta, the abdominal aorta, bilateral subclavian arteries and femoral arteries were audible. Laboratory tests resulted in an ESR of 71 mm/hour and a positive TB. Takayasu arteritis (TA) was suspected and a Dual Energy (DE) whole body CT angiography (CTA) was performed for further investigation.

Diagnosis

CTA images revealed multiple severe stenoses as well as dilation, accompanied by calcified plaques, bilaterally in the subclavian arteries. The left vertebral artery was severely stenosed at its origin. Luminal stenosis with wall thickening and transmural calcification were seen in the thoracic descending aorta and the upper abdominal aorta. A small pseudo-aneurysm, measuring 1.0 × 0.8 cm in size, was shown in the middle segment of the thoracic descending aorta. A severe stenosis in the ostium of the celiac artery as well as one in the proximal splenic artery were visualized. The common hepatic artery was occluded

and the blood supply was delivered via collaterals. A calcified aneurysm, in the proximal superior mesenteric artery (SMA) with pre- and post-aneurysm stenoses, was seen. The right external iliac artery was occluded, causing a distal blood flow in the femoral artery via collaterals. The left external iliac artery showed multiple stenoses and aneurysmal dilation. The left internal iliac artery was occluded. A diagnosis of an extensive TA was suggested based upon the configuration of the CT findings.

Comments

TA is a large vessel vasculitis which affects the aorta and its major branches. Amongst all different types, an extensive TA, such as this case, is extremely rare. To understand the condition of systemic vascular involvement, an acquisition of a whole body CTA using a single injection of contrast media is very helpful. When DE is performed, an automated workflow of bone removal, using *syngo*.CT DE Direct Angio, is provided to efficiently generate free views of the vessels. The typical manifestation of luminal stenosis, associated with mural thickening depicted in CTA images, may facilitate the visualization of vasculitis in the early phase of TA. Additionally, it has been shown that information associated with ischemia can be visualized by DE CTA, which may be helpful in evaluating prognosis.[1] ●

References

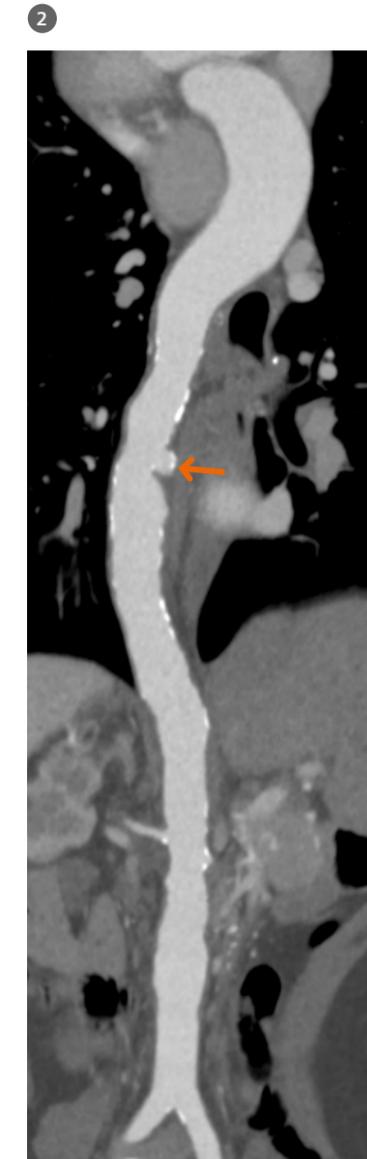
[1] ZHU F P, et al. Takayasu arteritis: imaging spectrum at multidetector CT angiography. *The British Journal of Radiology*, 2012, 85, e1282–e1292

Examination Protocol

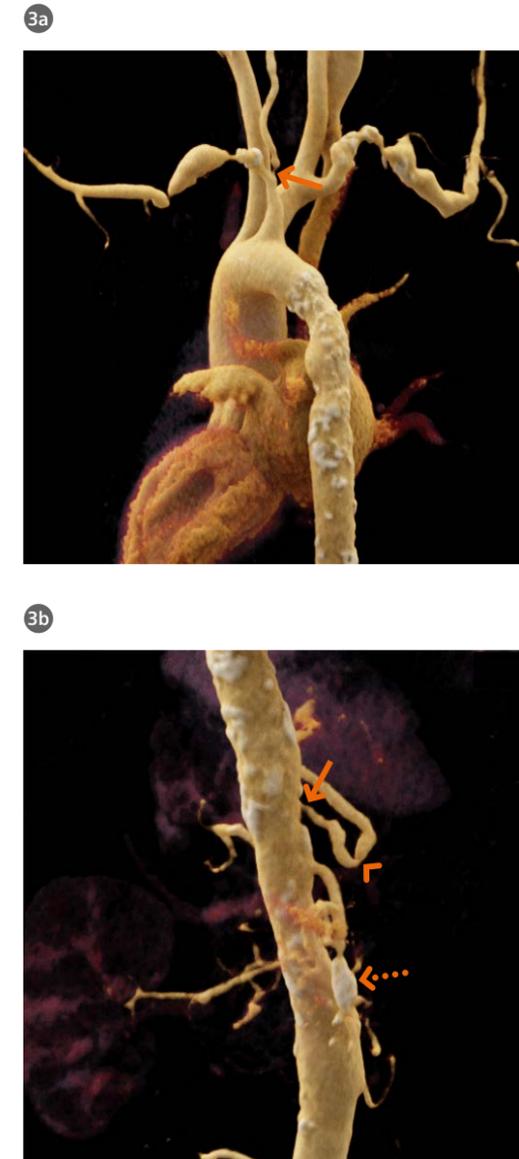
Scanner	SOMATOM Force
Scan area	Whole body
Scan mode	Dual Source Dual Energy
Scan length	1,466.3 mm
Scan direction	Cranio-caudal
Scan time	22 s
Tube voltage	90 / Sn150 kV
Effective mAs	72 / 45 mAs
Dose modulation	CARE Dose4D™
CTDI _{vol}	3.42 mGy
DLP	508.2 mGy cm
Rotation time	0.25 s
Pitch	0.3
Slice collimation	192 × 0.6 mm
Slice width	1.5 mm
Reconstruction increment	0.9 mm
Reconstruction kernel	Qr40 (ADMIRE 3)
Contrast	370 mg/mL
Volume	60 + 20 + 40 mL saline
Flow rate	4 mL/s + 2 mL/s + 4 mL/s
Start delay	Bolus tracking @ 100 HU in thoracic descending aorta +20s



1 A whole body CTA MIP image shows an overview of the extensive TA, involving bilaterally the subclavian arteries, thoracic descending aorta, upper abdominal aorta with its branches, bilaterally the external iliac arteries and left internal iliac artery. The collaterals for the hepatic artery and the right femoral artery are also clearly shown.



2 A curved MPR image shows luminal stenosis with wall thickening and transmural calcification in the thoracic descending aorta and the upper abdominal aorta. A small pseudo-aneurysm (arrow) in the middle segment of the thoracic descending aorta is also seen.



3 Cinematic VRT images reveal multiple severe stenoses as well as dilation, with calcified plaques bilaterally in the subclavian arteries (Fig. 3a). Severe stenoses at the origin of the left vertebral artery (Fig. 3a, arrow), the ostium of the celiac artery (Fig. 3b, arrow), and proximal splenic artery (Fig. 3b, arrowhead) as well as a calcified aneurysm (Fig. 3b, dotted arrow) in the proximal SMA with pre- and post-aneurysm stenoses are also shown.

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