A Stanford-A Acute Aortic Dissection

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History

A 42-year-old male patient, with a history of uncontrolled diabetes, was admitted to the hospital due to a sudden onset of acute xiphodynia that had been radiating to the chest and back for the past ten hours. CT angiography (CTA) was requested for a comprehensive evaluation.

Diagnosis

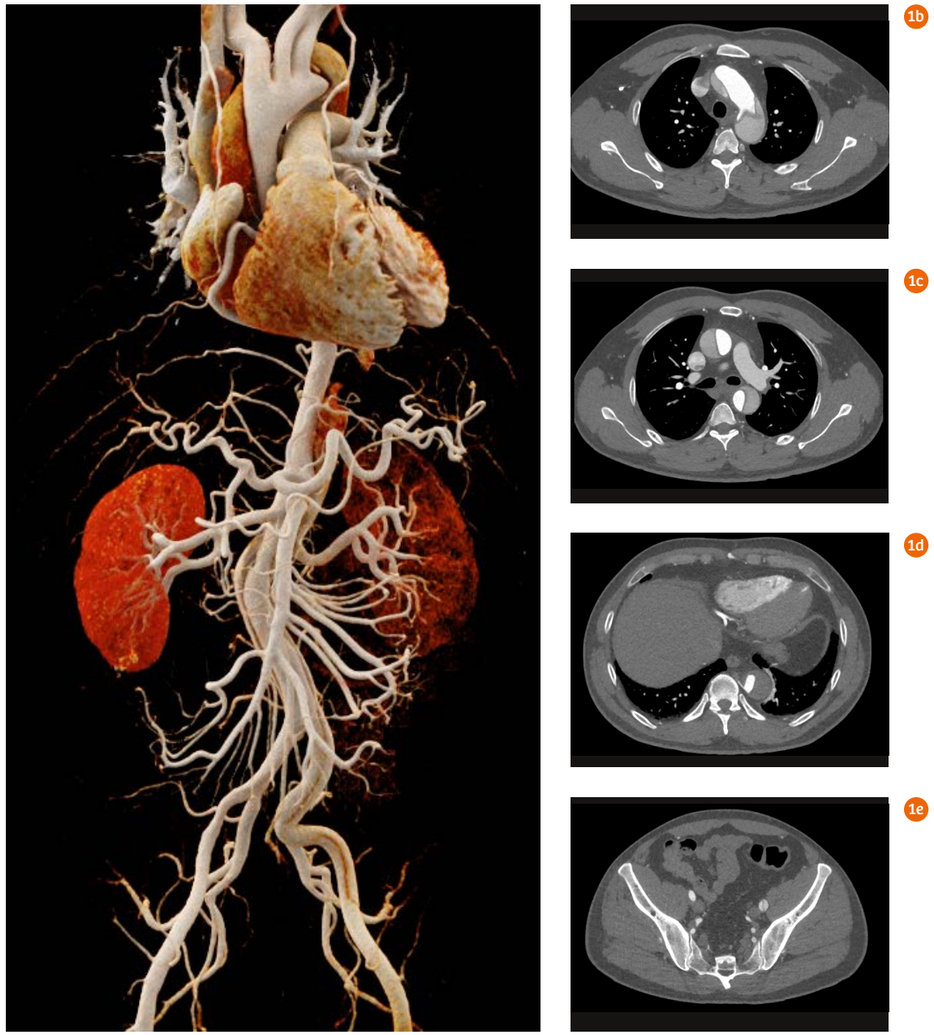
CTA images revealed an aortic dissection (Stanford type A) featuring a typical double lumen caused by an intimal flap extending from the ascending aorta to the left external iliac artery. The coronary arteries, brachiocephalic arteries, celiac trunk, mesenteric arteries, and the right renal artery all originated off the true lumen. The left renal artery issued from the false lumen, causing significantly less enhancement in the left kidney. A noncalcified plaque was seen in the proximal left anterior descending (LAD) coronary artery, causing a moderate stenosis. The patient was immediately transferred to the next higher level hospital for surgical treatment.

Comments

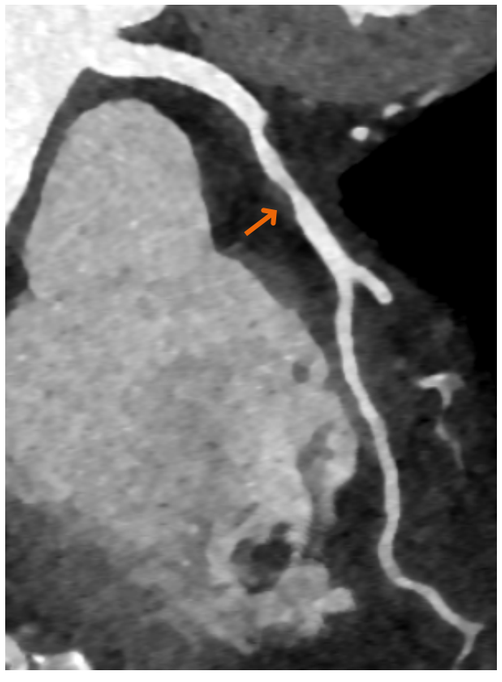
Acute aortic dissection (AAD), Stanford type A, is one of the most dramatic cardiovascular emergencies and requires immediate surgical intervention (1). CTA plays an important role in evaluating the entire aorta and the extension of the dissection, as well as in ruling out potential complications such as occlusion of the coronary arteries, rupture of the dissection into the pericardium, and abdominal ischemic diseases, possibly increasing mortality. It is fundamental that the CT scanner be equipped with a high temporal resolution, otherwise pulsation artifacts in the ascending aorta can occur, resulting in a misinterpretation of a pseudo-dissection. In this case, CTA was performed with a Dual Source CT scanner – SOMATOM Force – which provides a temporal resolution as high as 66 ms. An intimal flap and the dissected double lumen in the entire aorta were clearly visualized, as were the coronary arteries, even though ECG triggering or gating was not applied. The scan parameters, such as kV and mAs, are automatically set according to the chosen application and the patient's size. These optimize the radiation dose and the amount of contrast agent needed. Although the patient was not able to hold his breath during the scanning due to severe chest pain, excellent image quality was achieved using Turbo Flash Spiral mode, scanning the entire trunk in only 1.4 seconds. All these techniques help with prompt and confident decision-making for effective patient management.

Examination Protocol

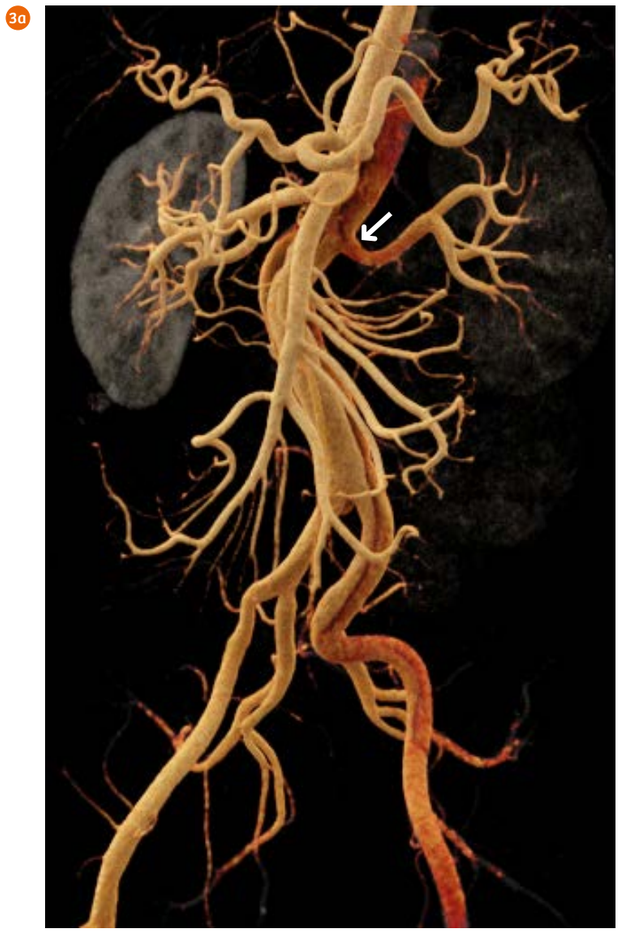
Scanner	SOMATOM Force		
Scan area	Trunk	**Rotation time**	0.25 s
Scan mode	Turbo Flash	**Pitch**	1.9
Scan length	654.5 mm	**Slice collimation**	192 × 0.6 mm
Scan direction	Cranio-caudal	**Slice width**	1.0 mm
Scan time	1.4 s	**Reconstruction increment**	0.7 mm
Tube voltage	90 kV	**Reconstruction kernel**	Bv40 (ADMIRE 3)
Effective mAs	98 mAs	**Contrast**	370 mg/mL
Dose modulation	CARE Dose4D™	**Volume**	70 mL + 40 mL saline
$CTDI_{vol}$	2.23 mGy	**Flow rate**	4 mL/s
DLP	151.4 mGy cm	**Start delay**	Bolus tracking with 100 HU at abdominal aorta + 7 s



1 A cinematic VRT (Fig. 1a) and four axial (Fig. 1b to Fig. 1e) images reveal a clear double-lumen aortic dissection with intimal flap extending from the ascending aorta to the left external iliac artery.



2 Two cinematic VRT images (Fig. 2a and Fig. 2b), two axial images (Fig. 2c and Fig. 2d), and a curved MPR image (Fig. 2e) show both coronary arteries coming off the true lumen. A noncalcified plaque (Fig. 2e, arrow) is seen in the proximal LAD causing moderate stenosis.



3 A cinematic VRT (Fig. 3a) and two axial (Fig. 3b and Fig. 3c) images show the left renal artery coming off the false lumen (arrows) causing less enhancement in the left kidney. The right renal artery originates off the true lumen (dotted arrow).

Reference

[1] Sebastià C, et al. Aortic dissection: diagnosis and follow-up with helical CT. RadioGraphics 1999 Jan-Feb;19(1):45-60.

The outcomes by Siemens Healthineers customers described herein are based on results that were achieved in the customer's unique setting. Since there is no "typical" hospital and many variables exist (e.g., hospital size, case mix, level of IT adoption), there can be no guarantee that other customers will achieve the same results.

In clinical practice, the use of ADMIRE may reduce CT patient dose depending on the clinical task, patient size, anatomical location, and clinical practice. A consultation with a radiologist and a physicist should be made to determine the appropriate dose to obtain diagnostic image quality for the particular clinical task.