Visualization of Endoleak after Abdominal Aortic Aneurysm Repair by Stenting and Bypass Grafting

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History

A 77-year-old male patient, who had suffered from an abdominal aortic aneurysm (AAA), had undergone aortic stenting with bypass graft one year ago. CT examination was requested for a follow-up evaluation.

Diagnosis

CT images revealed an AAA, measuring 5.6 × 8.2 cm in size, with aortic stents extending from the level of the diaphragm to the infrarenal abdominal aorta. A hyperdensity, which was not present in the pre-contrast images, was seen in the left posterior aspect of the aneurysm sac at the level of L1. This was compatible with a type II endoleak. A small left lumbar vessel, leading into the aneurysm sac, was shown. A bypass graft for the celiac artery (CA), superior mesenteric artery (SMA) and left renal arteries (LRA) with an anastomosis just above the level of the aortic bifurcation was visualized with no signs of stenosis. The grafted CA, SMA and LRA were patent, however, moderate stenoses were seen in the proximal SMA at its genu and in the mid LRA. The right kidney appeared smaller and less enhanced. The right renal artery (RRA) was distally opacified, although not well seen proximally. The common iliac arteries were aneurysmal, measuring up to 2.0 cm on the right and 1.8 cm on the left. Atherosclerotic calcifications were seen in the native abdominal aorta (AA) and bilateral iliac arteries (IA).

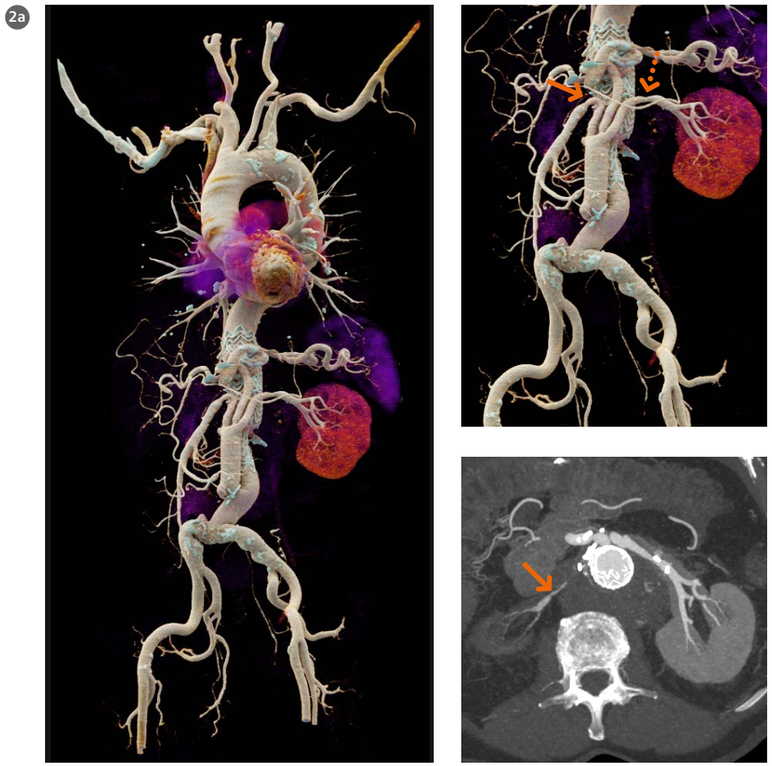
Examination Protocol

Scanner	SOMATOM go.Up		
Scan area	CAP	**Rotation time**	0.8 s
Scan mode	Spiral mode	**Pitch**	1.2
Scan length	709.2 mm	**Slice collimation**	32 × 0.7 mm
Scan direction	Cranio-caudal	**Slice width**	0.6 mm
Scan time	21 s	**Reconstruction increment**	0.6 mm
Tube voltage	80 kV	**Reconstruction kernel**	Bv36 (SAFIRE 3)
Effective mAs	127 mAs	**Contrast**	350 mgI/mL
Dose modulation	CARE Dose4D™	**Volume**	90 mL + 60 mL saline
CTDIvol	3.42 mGy	**Flow rate**	4 mL/s
DLP	257 mGy cm	**Start delay**	Bolus tracking @100 HU in thoracic descending aorta + 5 s

1 Axial images (Fig. 1a and 1b) show a hyperdensity in the left posterior aspect of the aneurysm sac (arrow, Fig. 1b), which is not present in the pre-contrast image (Fig. 1a). This is compatible with a type II endoleak. A MIP image (Fig. 1c) shows a small left lumbar vessel (dotted arrow), leading into the aneurysm sac.

Comments

An endoleak is characterized by persistent blood flow within the aneurysm sac following endovascular aneurysm repair (EVAR). It is a common complication and often asymptomatic. If untreated, the aneurysm may expand and is at risk of rupture. Therefore, lifelong imaging surveillance is necessary and it is usually performed with CT angiography (CTA). Taking into consideration the number of repeated scans, the ALARA (as low as reasonably achievable) principle of radiation exposure to the patient should be applied. In this case, CTA was performed using 80 kV to improve contrast-to-noise ratio (CNR) and reduce radiation dose. Combined with CARE Dose4D (real-time anatomic exposure control) and SAFIRE (Sinogram Affirmed Iterative Reconstruction), a total radiation dose of only 3.42 mGy was applied and hereby achieved a comprehensive evaluation of the aortic stenting and bypass grafting, as well as the visualization of an endoleak. ●



2 Cinematic VRT images (Fig. 2a and 2b) show an abdominal stent and a patent bypass graft for the CA, SMA, and LRA with an anastomosis just above the level of the aortic bifurcation. Moderate stenoses are seen in the proximal SMA at its genu (arrow), and in the mid-LRA (dotted arrow). Atherosclerotic calcifications are present in the native AA and bilateral aneurysmal IA. A MIP image (Fig. 2c) shows a small, distally opacified RAA (arrow).