

Case 1

Discovery of a Type II Endoleak after EVAR in a Patient with Renal Insufficiency using Dynamic 4D CT Angiography

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History

A 72-year-old male patient with poor kidney function (GFR 40 mL/min) was admitted to the hospital with a suspected endoleak after an endovascular aneurysm repair (EVAR) of the abdominal aorta. A dynamic 4D CT angiography (CTA) was requested to confirm the endoleak and to specify its type.

Diagnosis

CT images showed an abdominal aortic aneurysm (AAA) and a stent within it, placed during EVAR. Proof

of an endoleak (Figs. 1 and 2) was seen in the delayed phase, as was the aneurysmal feeder artery (Fig. 3). A type II endoleak was confirmed.

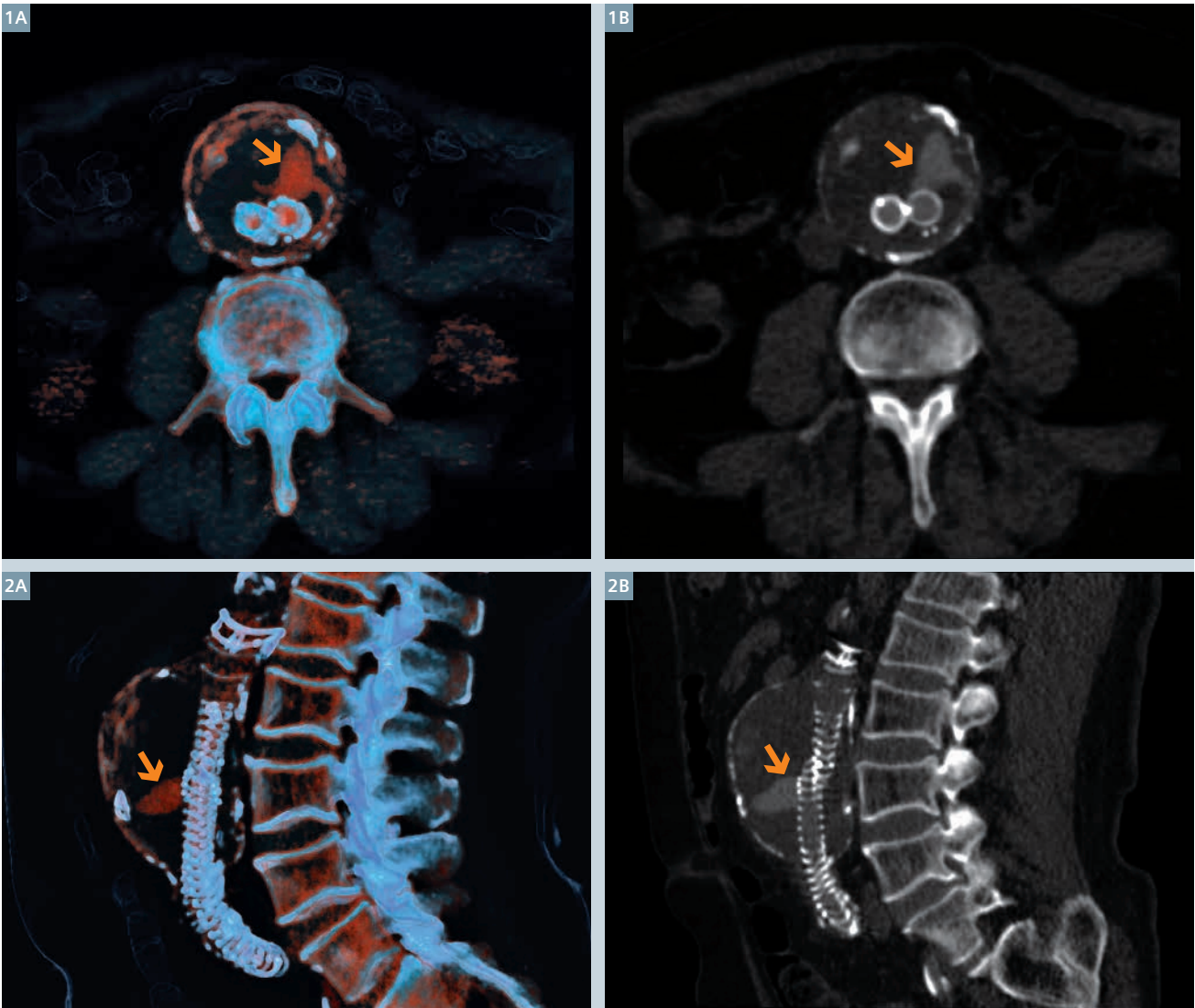
Comments

Due to the patient's poor kidney function, the examination was completed with only 12 cc of contrast, at a 60% dilution (total injected volume 20 cc), followed by a 30 cc saline chaser, both with a 5 cc/s injection rate. This was achieved by conducting the scan at 70 kV, to close the gap to the k-edge and enhance the contrast, as well as

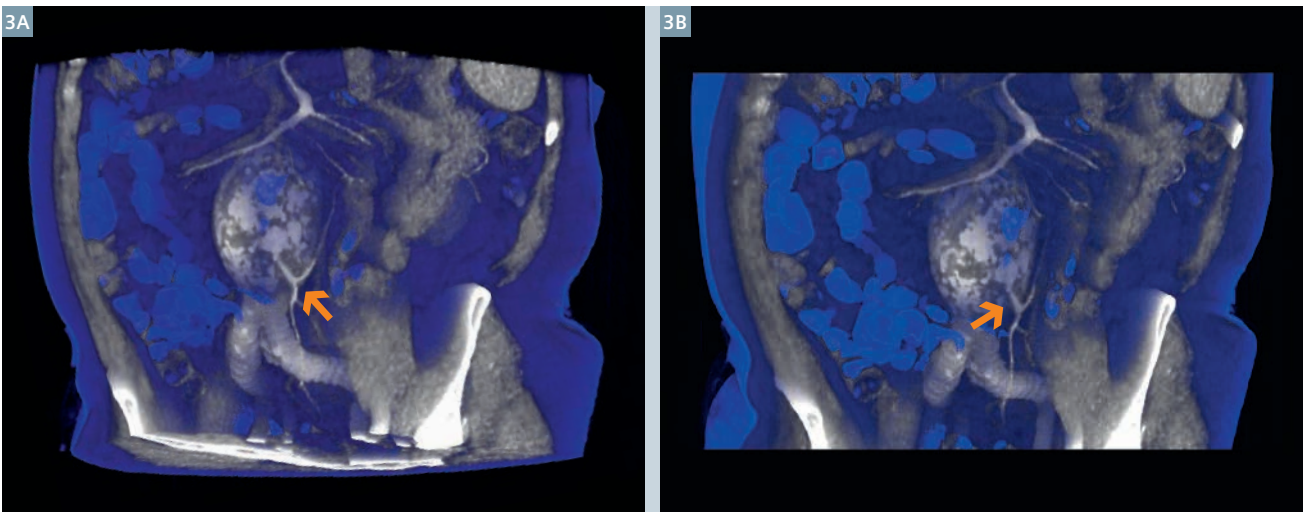
by using a dynamic 4D scan protocol for a shorter scan range than a standard abdominal CTA. The multiple acquisition time points of the dynamic scan make overtaking or missing the bolus highly unlikely. The images were viewed on a 4D viewer. It was seen clearly that the contrast flow into the aneurysm (the endoleak) was delayed in comparison with that into the aorta. This is an indirect sign of a type II rather than a type I endoleak. Further evaluation of the same dataset revealed a small feeder artery, thus confirming the diagnosis. ■

Examination Protocol

Scanner	SOMATOM Force		
Scan area	Abdomen	Slice collimation	48 × 1.2 mm
Scan length	222 mm	Slice width	1.5 mm
Scan direction	Adaptive 4D spiral	Reconstruction increment	1 mm
Scan time	36 s	Reconstruction kernel	Bv36
Tube voltage	70 kV	Reconstruction increment	0.5 mm
Tube current	200 mAs	Contrast	400 mg / mL
CTDI _{vol}	43.46 mGy	Volume	12 mL (20 mL diluted to 60%) + 30 mL saline
DLP	905 mGy cm	Flow rate	5 mL / s
Effective dose	13.6 mSv	Start delay	8 s
Rotation time	0.25 s		



1-2 Axial (Fig. 1) and sagittal (Fig. 2) views of VRT (A) and MPR (B) images show the endoleak (arrows).



3 VRT image demonstrates the feeder artery (arrows) to the aneurysm and thus confirms a type II endoleak.