Intra-operative dynaCT in visceral-hybrid repair of an extensive thoracoabdominal aortic aneurysm

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A 79-year-old presented with a thoracic rupture of a type II thoracoabdominal aneurysm. A hybrid-procedure (four-visceral-vessel debranching and simultaneous endografting) was performed (Fig. 1).

Completion angiography was unable to visualize the distal — landing zone adequately to exclude stent-related complications due to the proximity of the overlying inflow-graft (Fig. 2A). Intra-operative DynaCT offered cross-sectional evaluation ensuring technical success (Fig. 2B and C).

Fig. 1. Intra-operative Angiographic CT (DynaCT, Axiom-Artis, Siemens, Germany): a total of 48 mL of radiographic contrast (Visipaque 320 mg I/mL) at 8 mL/s (96 mL of 50% diluted medium) is injected via a transfemoral 4F pigtail catheter. Angiographic CT parameters, with respiration suspended, are 0.8° increment, 512 matrix projection, 220° total angle, 20°/s, 20 frames/s with 248 projections. The time interval from C arm rotation to automatic generation of images on the monitor is 122 s with an acquisition time of 8 s (4 s delay). Multiplanar reconstructions are performed on a commercially available workstation (Voxar 3D, Barco, Kortrijk, Belgium) with the images being presented as maximum intensity projection images (MIP). The cumulative radiation dose for DynaCT is 123 mGy (Dose Area Product 3574.0 microGY/m²). 3-D rendering: an inverted 16 × 8 mm Dacron™ graft is anastomosed to the left common iliac artery (inflow-artery) bypassing onto the superior mesenteric artery and the coeliac trunk with a lazy “C” configuration. Renal arteries are revascularised with separate 6 mm Dacron™ grafts anastomosed to each limb of the inflow-graft. Aneurysm exclusion is achieved by the subsequent deployment of Valiant and bifurcated Talent endografts.

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Fig. 2. (A) Completion uni-planar angiography is unable to clearly visualize both the endograft distal landing zone (DLZ) and the origin of the retrograde inflow-graft anastomosed to the common iliac artery (CIA). (B and C) DynaCT provides immediate high contrast space resolution (10 HU), multi-planar images demonstrating visceral-grafts patency (1 and 2: prosthetic limbs bypassing onto the SMA and coeliac trunk; 3 and 4: grafts bypassing onto the renal arteries) and excluding stent-related anomalies (endoleaks, kinking, dissection, thrombosis). Clear imaging of the DLZ and the origin of the inflow-graft ensures both surgical and endovascular technical success.