Magnetic Resonance Angiography of an Aortic Dissection

Tim Leiner, MD; Ted W.O. Elenbaas, MD; Dave W. Kaandorp, PhD; Kai Yiu J.A.M. Ho, MD, PhD; Michiel W. de Haan, MD; Jos M.A. van Engelshoven, MD, PhD

A 51-year-old man with hypertension had previously been admitted to our cardiothoracic unit with a type A aortic dissection (Stanford classification) and had undergone emergency surgery with partial replacement of the ascending aorta. Routine follow-up magnetic resonance angiography (MRA) 19 months after the operation revealed an aneurysm at the incision site in the ascending aorta and extension of the dissection into the descending aorta. MRA was performed with 2 sequential breath-hold 3D contrast-enhanced scans, each lasting 25 seconds. The resolution of the reconstructed images was 2.0×2.2×1.5 mm. For postprocessing, the scans were sent to an offline workstation (EasyVision, Philips Medical Systems), where 3D shaded surface renderings were created. Surface renderings of the first scan allowed excellent evaluation of the ascending and descending aorta as well as the aortic arch. In the ascending aorta, a patch-like aneurysm ≈7×19×29 mm was seen (Figures 1 and 2). The descending aorta shows tapering of the lumen from just proximal to the diaphragmatic hiatus all the way into the iliac arteries. Images of the second scan clearly show the filling of a huge false lumen from the iliac arteries all the way up to the diaphragmatic hiatus (Figures 3 and 4). The total length of the dissection is >25 cm. On image 4, it can be appreciated that the left kidney is dependent on the false lumen for its blood supply. Examination of the source images showed that the only patent connection between the true and false lumina was in the left iliac artery (Figure 4). The patient remains asymptomatic at this writing and will be followed up carefully for progression of the disease.

References
Figure 1. Coronal projection of first scan (breath-hold contrast-enhanced MRA) of patient with dissection in ascending and descending aorta. Heart and pulmonary vasculatures were removed from data set. Right renal artery and an accessory right renal artery (arrowhead) branch off true lumen. Note that no left renal artery is visible and no filling as yet of false lumen. SVC indicates superior vena cava; Ao, aorta; A, aneurysm; TL, true lumen; CT, celiac trunk; S, superior mesenteric artery; R, right renal artery; CI, right common iliac artery; LCl, left common iliac artery; large R, right side of patient; and large L, left side of patient.

Figure 2. Left anterior oblique view of same data set as in Figure 1. This image better shows relation of aneurysm to ascending aorta. In descending aorta, tapering of lumen and absence of left renal and left lumbar arteries can be appreciated. Abbreviations as in Figure 1.
Figure 3. Coronal projection of second scan, which was acquired directly after first, shows emergence of false lumen that is excluded from descending aorta. Left renal artery and accessory renal artery branch off this false lumen. Arrowheads point to accessory renal arteries. S indicates left subclavian artery; PT, pulmonary trunk; SV, splenic vein; LRV, left renal vein; RCI, right common iliac artery; FL, false lumen. Other abbreviations as in Figure 1.

Figure 4. Dorsal projection of second scan. This image shows connection between true and false lumina at origin of iliac arteries. False lumen fills retrogradely through this connection. Note that dissection continues into right common iliac artery. Small L indicates left renal artery; small R, right renal artery. Other abbreviations as in previous figures. A 3D rotation of this image is available online.
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