Case Blog

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Visualization of an Aortic Coarctation, Induced by a Thoracic Stent Graft, Using 4D Magnetic Resonance Imaging

Knapsis A, Schelzig H and Oberhuber A

Department of Vascular and Endovascular Surgery, University of Duesseldorf, Germany

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Corresponding author:
Alexander Oberhuber

Alexander.Oberhuber@med.uni-duesseldorf.de

Department of Vascular and Endovascular Surgery, University of Duesseldorf, Moorenstraße 5, 40225 Duesseldorf, Germany.

Tel: 0211/81-19679
Fax: 0211/81-19091

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Case Blog

In 2001 a 13-year-old girl was taken to hospital after car accident, injured by multiple traumas, including an aortic rupture loco typico. Bleeding was brought under control via an endovascular approach with a Gore (W. L. Gore and Associates, Flagstaff, Ariz, USA) iliac limb 14-16-7. Follow-up CT scans showed over the years a relevant, but constant, bird-beak configuration of the stent graft **(Figure 1)**. In 2009 the patient developed progressive arterial hypertension with a secondary hyperparathyroidism. For further investigation a conventional angiography with pressure gradient measurement and a four-dimensional magnetic resonance imaging was performed. The quantitative flow measurements were obtained by means of a retrospective ECG gated cardiac-phase resolved three-dimensional T1 weighted fast gradient echo acquisition [1,2].

The pressure gradient across the stent graft was 39 mmHg. Angiography showed a significant movement of the proximal end of the stent graft **(Figure 2)**. The MRI confirmed the suspicion of a high-grade stenosis resulting in a functional coarctation. Flow analysis showed acceleration from 58 cm/s in the ascending aorta to 180 cm/s at the proximal end of the stent graft **(Figure 3** and **Video 1)**. The patient underwent open conversion with explantation of the stent graft and prosthetic graft insertion.

Figure 1 CT scan shows a relevant bird peak configuration of the thoracic stentgraft. The proximal end of the Gore stentgraft has no bare springs and is projected into the aortic arch.

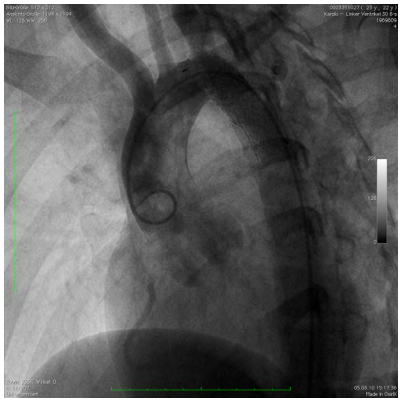


Figure 2 Angiography of the stentgraft-induced stenosis. The bulge of the stentgraft in the former rupture site of the aorta is visible as well.

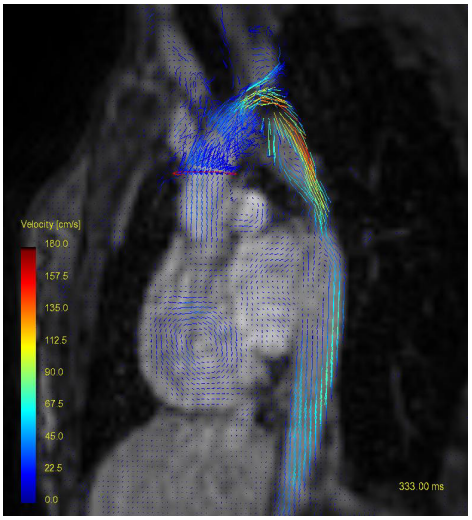
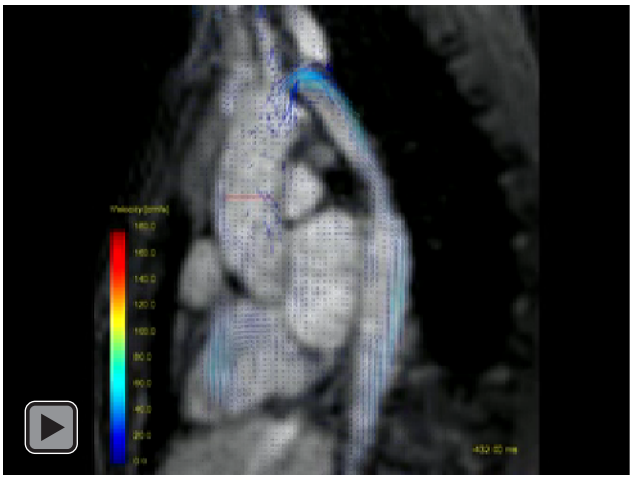


Figure 3 Sagittal MRI of the stentgraft with colour encoded flow analysis.



Video 1 Flow encoded MRI. Deep red visualization indicates strong flow acceleration at the proximal end of the stentgraft.

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