Unique haemodynamics in the patient with residual native aortic regurgitation who underwent apicoaortic bypass

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An 82-year-old woman suffered from severe aortic stenosis and mild aortic regurgitation with porcelain aorta. She underwent apicoaortic bypass (AAB). Postoperative haemodynamic evaluation was performed using phase-contrast cine magnetic resonance imaging (MRI). In the aortic arch and descending aorta, blood flow was bidirectional and no stagnation occurred during the whole cardiac cycle.

Unique haemodynamics in a patient who underwent AAB was investigated by phase-contrast cine MRI.

An 82-year-old woman suffered from severe aortic stenosis with porcelain aorta. Echocardiography revealed a peak aortic pressure gradient of 67 mmHg, an aortic valve area of 0.73 cm², and mild aortic regurgitation. She underwent AAB with a 20 mm Gelweave straight graft and a 21 mm Carpentier-Edwards Prima Plus valve.

Haemodynamic evaluation was carried out by MRI 2 months after the operation.

Systolic volume through the native aortic valve into the ascending aorta was 15 mL (Panel A1) and systolic volume through the AAB into the descending aorta was 26 mL (Panel A2). Interestingly, continuous flow was detected through the AAB into the descending aorta during the whole cardiac cycle (Panel A2). In diastole, aortic regurgitant flow was released through the AAB into the descending aorta (Panels A2 and C). In the aortic arch and descending aorta, blood flow was bidirectional and no stagnation occurred during the whole cardiac cycle (Panels A3 and A4).

Panel (A) Reconstructed flow velocity curves and MRI images. A positive flow velocity value indicates antegrade flow.

(A1) The negative value in diastole indicates antegrade flow.

(A2) The positive values over the cardiac cycle indicate continuous antegrade flow in the graft into the descending aorta.

Blood flow in aorta during systole (B) and diastole (C). The arrows indicate direction of flow; the numbers indicate flow volume in millilitres.