Cardiac Imaging

Pulmonary Valve Replacement with Aortic Homograft

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We present a 52-year-old man with congenital pulmonic stenosis. At the age of 15 he underwent surgical pulmonary valvotomy and enlargement of the right ventricular outflow tract (RVOT) with insertion of a pericardial patch. He subsequently developed a severe degree of pulmonary valve insufficiency for which he underwent a second surgical procedure replacing the pulmonary valve with an aortic valve homograft.

Cardiac magnetic resonance imaging was used,[1] among other diagnostic examinations, prior to and six months after the final surgical procedure in order to evaluate the cardiac anatomy and function.

Comparing the two studies, we found that postoperatively there was a significant reduction in the size of the right cardiac cavities (Figure 1B), with reversal of the interventricular septal flattening (Figure 2B) and trivial bioprosthetic valve insufficiency
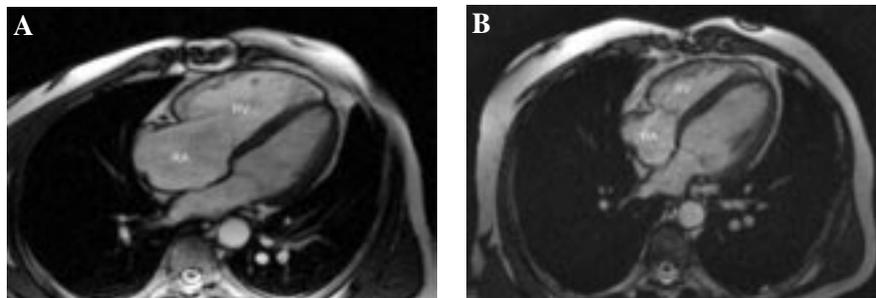

Figure 1. White blood sequences, four-chamber view. Large dimensions of the right cardiac chambers (A), which showed significant reduction six months after pulmonary valve replacement (B). RV – right ventricle; RA – right atrium.
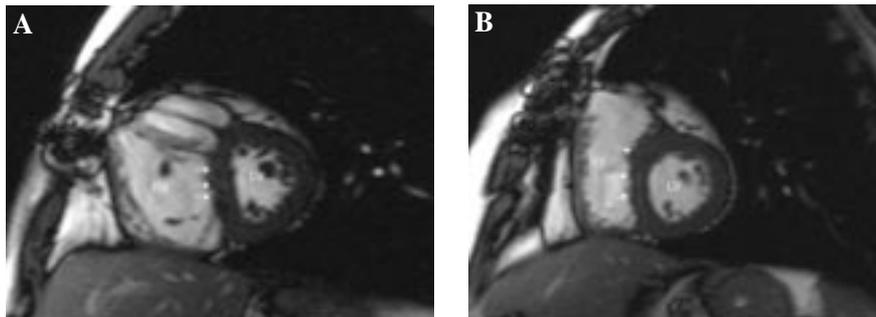

Figure 2. White blood sequences, short axis. Flattening of the interventricular septum during diastole because of high pressures in the right cavities before operation (A, white arrows) and its disappearance postoperatively (B, white arrows). LV – left ventricle; RV right ventricle.

in the pulmonic position (Figure 5B). There remained dilatation of the pulmonary artery trunk (Figures 3, 4) and its main branches (Figure 4) with RVOT free wall akinesia at the site of the pericardial patch.

References

1. Bogaert J, Dymarkowski S, Taylor AM: Clinical Cardiac MRI, in Baert AL, Sartor LK (eds.): Medical Radiology, Diagnostic Imaging. Springer Editions, Heidelberg, 2004, pp. 91-92, 368-370.
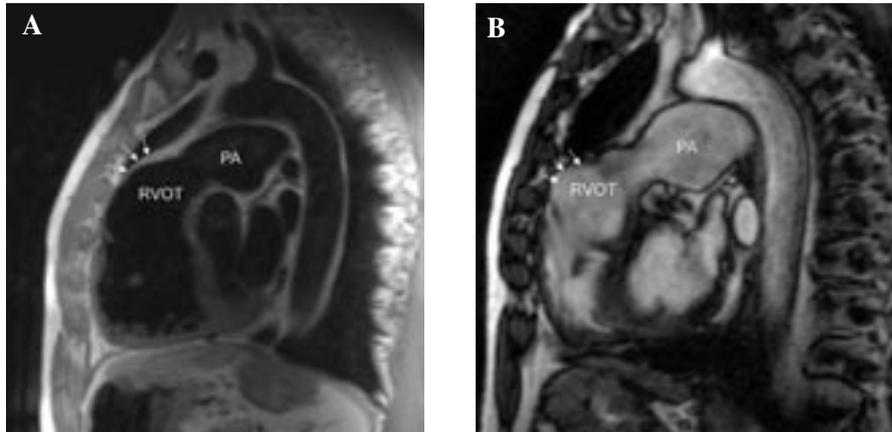
Figure 3. Right ventricular outflow tract (RVOT). Black blood sequences (A) show the increased right ventricular dimensions, the site of placement of the pericardial patch (white arrows) and dilatation of the main trunk of the pulmonary artery. The corresponding postoperative white blood (B) sequence shows a reduction in the right ventricular dimensions, the pulmonary artery dilatation and the akinesia (during dynamic imaging) of the RVOT free wall in the region of the patch (white arrows). PA – pulmonary artery.
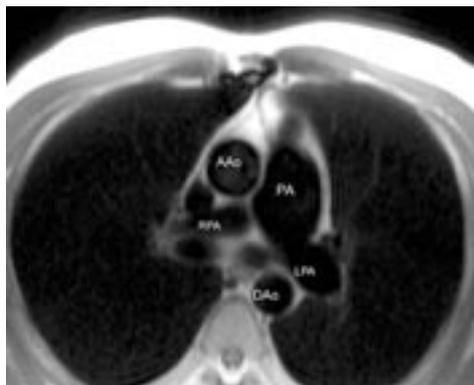

Figure 4. Black blood sequence, transverse axis. Dilatation of the main trunk of the pulmonary artery and its main branches. PA – pulmonary artery; RPA – right pulmonary artery; LPA – left pulmonary artery; AAo – ascending thoracic aorta; DAo – descending thoracic aorta.
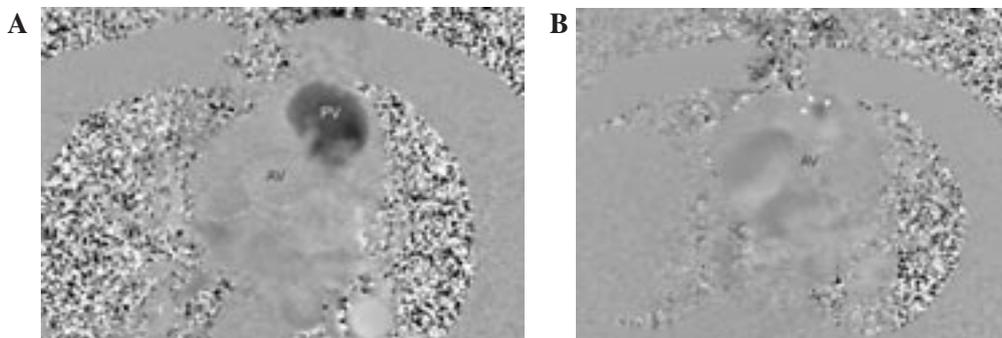

Figure 5. VENC sequences. A: Significant pulmonary valve insufficiency (dark region due to signal loss). B: Postoperatively the homograft shows only slight insufficiency (white arrows). Note that the Vmax for blood flow through the homograft was 2 m/s, with maximum systolic pressure gradient 16 mmHg. PV – pulmonary valve; AV – aortic valve.