

## Assessment of Pulmonary Veins after Atrio-Pericardial Anastomosis by Magnetic Resonance Imaging

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**Objectives:** The atrio-pericardial anastomosis (APA) or "sutureless repair" uses a pericardial pouch to create a large communication between the left atrium and the pulmonary venous tributaries, avoiding direct suturing of the pulmonary veins. It is hoped that this technique leads to a reduction in the occurrence of postoperative stenosis. Post-operative imaging is routinely performed by echocardiography but cardiac magnetic resonance (CMR) offers excellent anatomical imaging and quantitative information about pulmonary blood flow. We sought to determine the diagnostic value of CMR for assessing pulmonary vein anatomy after APA.

**Methods:** This retrospective study evaluated all consecutive patients between October 1998 and January 2010 after either a primary or secondary APA followed by a post-repair CMR. The imaging protocol included angiography and phase contrast flow velocity mapping of the pulmonary arteries and veins. The CMR findings were compared to those on echocardiography.

**Results:** Of 103 patients who had an APA at our institution, 31 patients had an analyzable CMR study. Out of these patients PV stenosis was suspected in 17 patients (55%) prior to CMR, by either clinical examination, chest radiography, echocardiography or a combination of the above. Echocardiography detected pulmonary vein stenosis in 13 out of the 17 (76%). The average time to CMR was  $24.6 \pm 32.5$  months post-repair. Echocardiographic findings were confirmed by CMR in 12 patients. There was incomplete imaging by echocardiography in 7 patients and underestimation of pulmonary vein restenosis in 12, when compared to CMR. In total, 19/31 patients (61%) from our cohort had significant stenosis following APA as assessed by CMR (the figure shows left lower pulmonary vein stenosis by contrast-enhanced angiography). Our data suggest that at least 18% (19/103) of all patients had significant obstruction post-repair.

**Conclusions:** Echocardiography incompletely images or underestimates the severity of obstruction in a significant proportion of patients following APA, as compared with CMR. Pulmonary vein stenosis remains a sizable complication after repair, even using APA.

