

## Cardiac Imaging

# Cardiac Magnetic Resonance Imaging for Evaluation of Atrial Septal Defects

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**Cardiac magnetic resonance imaging, congenital heart disease, atrial septal defect.**

**A** 21 year-old woman with a murmur since childhood reports mild dyspnoea with exertion. Echocardiography diagnosed an atrial septal defect. Further evaluation for the quantitation of the functional significance was performed using cardiac magnetic resonance imaging (CMR - Figures 1 and 2).

The advantages that CMR has for evaluation of patients with atrial septal defects include:

1. The precise noninvasive evaluation of the left-to-right shunt with quan-

titation of the blood flow in the pulmonary and systemic circulation, and calculation of the Qp/Qs ratio.<sup>1</sup> This is accomplished with a particular technique (phase contrast sequence), in which the phase shift of the moving protons in a magnetic field gradient is encoded as grey scale intensity, depending on their velocity. In the patient we present the left-to-right shunt was clinically significant (Qp/Qs = 2).

2. The exclusion of other congenital anomalies that can also result in right

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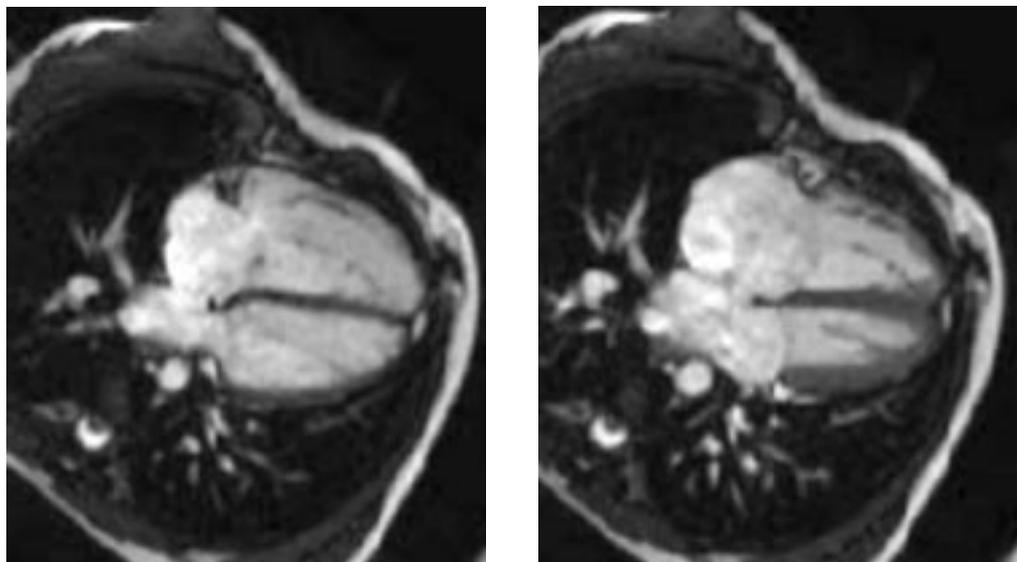
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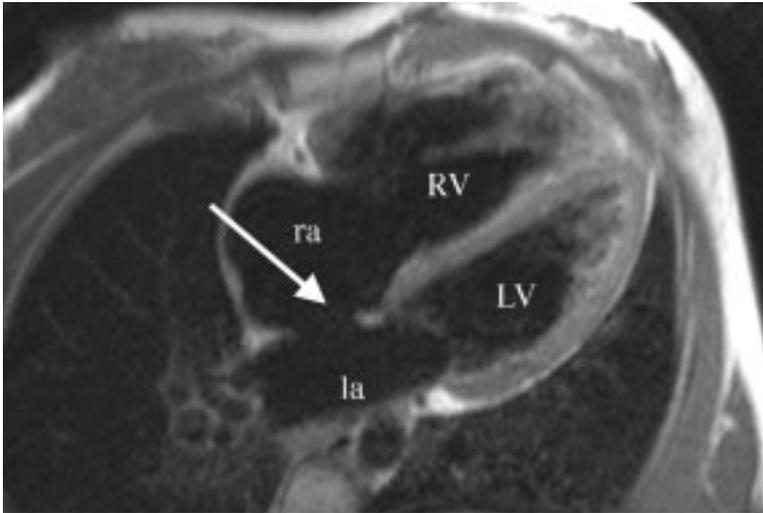
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**Figure 1.** Four-chamber view in end-diastole (left) and end-systole (right) in the functional CMR study demonstrates significant dilatation of the right heart chambers.



**Figure 2.** The anatomical study with a black blood sequence in the same plane (4-chamber view) confirms the right heart dilation and the atrial septal defect (arrow). LV = left ventricle, la = left atrium, RV = right ventricle, ra = right atrium.

heart dilation due to left-to-right shunt at the atrial level (e.g. anomalous pulmonary vein return), or due to an obstruction in the pulmonary circulation (pulmonary valve stenosis, or stenosis of the pulmonary artery or its peripheral branches).<sup>2</sup>

3. The evaluation of the right ventricular systolic function.

4. The assessment of the atrial defect size and the borders around it, in order to plan the feasibility of catheter/ device closure.<sup>3,4</sup>

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