

Technologist presentation

## Pediatric CMR evaluation of double outlet right ventricle using a hybrid suite

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### Introduction

A one month old female with an echocardiographic diagnosis of double outlet right ventricle was brought into the MRI for a morphological assessment of the heart. There was possibly a small remote inlet ventricular septal defect, whilst the left atrium appeared hypertensive.

### Purpose

To use a combined conventional fluoroscopic cardiac catheterization and magnetic resonance imaging (XMR) suite to further delineate the cardiac morphology in a patient with a double outlet right ventricle with a small remote inlet ventricular septal defect.

### Methods

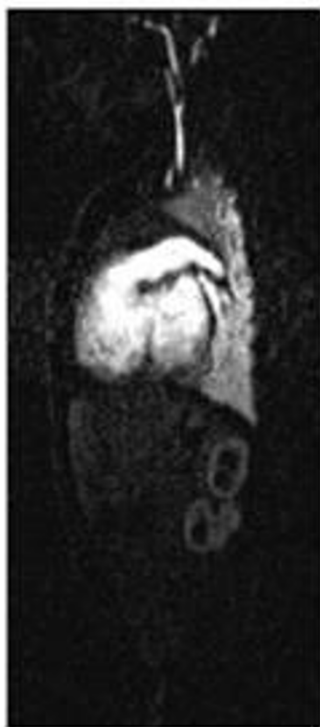
Following balloon atrial septostomy in the catheterization lab, the anesthetized patient was transferred into the Siemens 1.5T Avanto MR scanner on a moveable tabletop. Three plain localizer images were obtained using an ECG gated static TrueFISP technique. Next, cine images of the heart were acquired in the two-chamber, four-chamber, short axis, and right ventricular outflow tract views with a TrueFISP technique. A non-gated contrast-enhanced MR angiogram was performed in the sagittal plane using 0.3 mMol/kg of dilute gadolinium. The angiographic 3-D data-set was then used to create a life size plastic model which allowed the cardiovascular surgeon to inspect the relationship of the ventricles, interventricular communication and great arteries.

### Results

After the septostomy, the MRI confirmed the presence of a large inter-atrial communication. The ventricular septal defect was seen extending from the perimembranous septum toward the inlet and to a lesser extent toward the outlet. Both ascending aorta and main pulmonary artery were arising from the right ventricle with the aorta posterior and rightward. The MRI generated model helped to confirm that this patient would not be suitable for a biventricular repair of the double outlet right ventricle due to the small size and position of the ventricular septal defect and the chordal attachments seen on echocardiography. Figures 1, 2 and 3.

### Conclusions

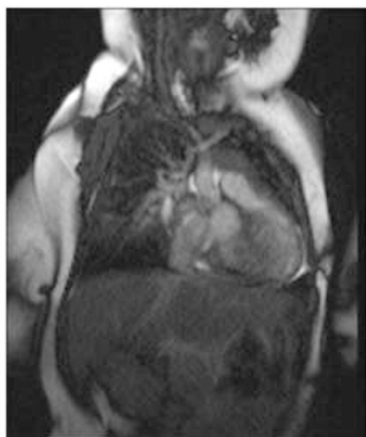
This case demonstrates the evolving use of a XMR system for percutaneous intervention and advanced diagnostic techniques in congenital heart disease. From the balloon septostomy in the cath lab to the intra-cardiac anatomy provided by the MRI study, one anesthetic could provide additional diagnostic information without any additional risk to the patient. The cardiac surgical team has found the opportunity to view the structures in the form of a life size plastic model helpful for planning their interventions. MRI anatomical information showing complex spatial relationships of cardiac structures can be used to guide interventional procedures and open new avenues for future research that combines x-ray angiography and MRI.



**Figure 1**



**Figure 2**



**Figure 3**

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