

## Fetal diagnosis of pulmonary atresia with VSD vs. common arterial trunk using antenatal MRI

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### Introduction

Differentiating common arterial trunk from pulmonary atresia with ventricular septal defect can be challenging antenatally. We present a case of pulmonary atresia with aortopulmonary collateral arteries diagnosed using fetal cardiovascular MRI as an adjunct to ultrasound.

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### Methods

A 20-week fetus was referred following routine antenatal screening. Serial echocardiography demonstrated a large VSD with a single outlet vessel, however the pulmonary blood supply could not be conclusively determined using ultrasound alone. The patient was therefore referred for prenatal MRI at 31 weeks. Using multiple overlapping multi-slice 2D single-shot fast spin echo sequences (Philips, 1.5T, TR = 15000ms, TE = 100ms, flip angle = 90 degrees, voxel size = 1.25 x 1.25mm, slice thickness = 2.5mm, SENSE factor = 2, partial Fourier-factor 5/8, slice duration 468ms) combined with a GPU accelerated super-resolution algorithm for slice-volume registration to compensate for fetal movement, a "black-blood"-like 3D dataset was produced with an isotropic voxel size of 0.5mm.

### Results

The resulting 2D and 3D images are demonstrated in figure 1. At least two large collateral vessels are seen originating from the anterior descending aorta. No native branch pulmonary arteries were identified. In particular, no pulmonary vessels were seen emanating from the ascending aorta, ruling out the major variants of common arterial trunk. Parental counselling was adapted accordingly.

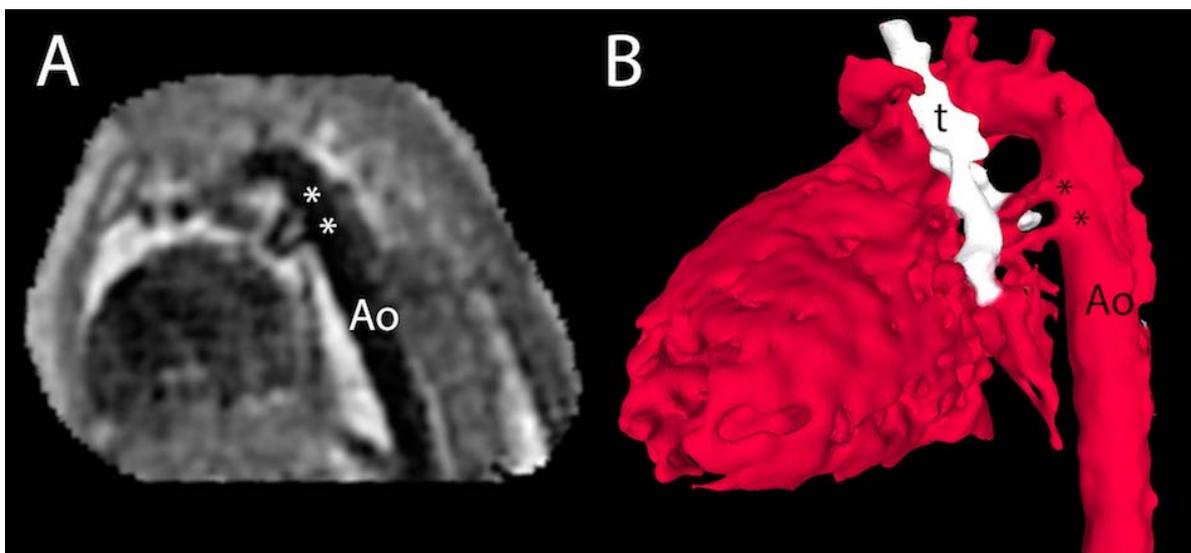
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### Conclusion

Antenatal MRI offers the potential to visualise vascular anatomy more comprehensively than ultrasound alone. Clarifying the extracardiac vascular pattern can have an important impact on antenatal counselling in many forms of congenital heart disease.

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**Figure 1:** A: Reconstructed image from a 31 week fetus 2D image showing two large aortopulmonary collateral arteries (\*) originating from the anterior descending aorta. B: 3D reconstruction of the same data. The trachea (t) is shown in white. Ao = aorta.