

Magnetic Resonance Imaging in Pediatric Patient with Dextrocardia and a Large Left Ventricular Outflow Tract Pseudoaneurysm

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BACKGROUND

CARDIAC MRI

- No ionizing radiation
- Non-invasive
- Often requires sedation

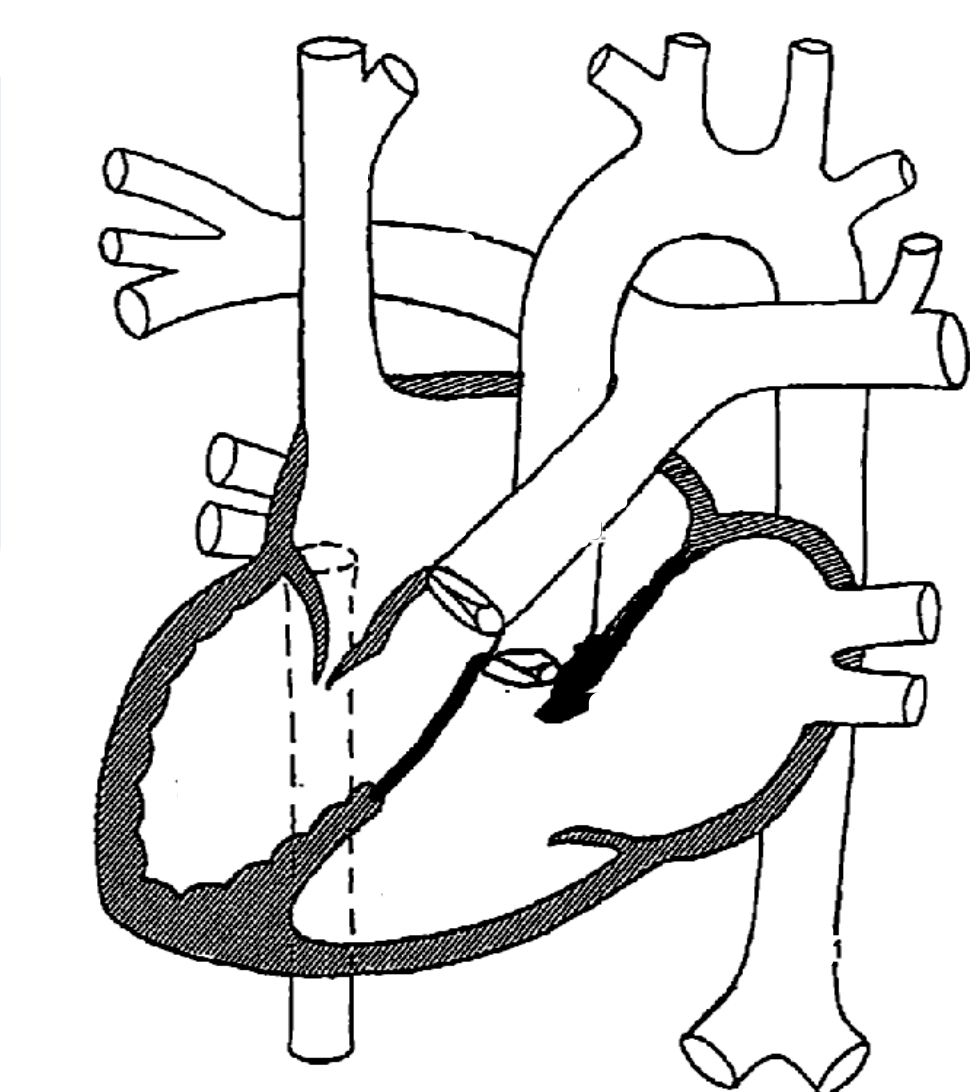
FERUMOXYTOL CONTRAST

- Superparamagnetic Iron Oxide (SPIO)
- Intravascular Contrast
 - Half-life 18 hrs
- Not associated with nephrogenic systemic fibrosis
- Off label use as MRI contrast

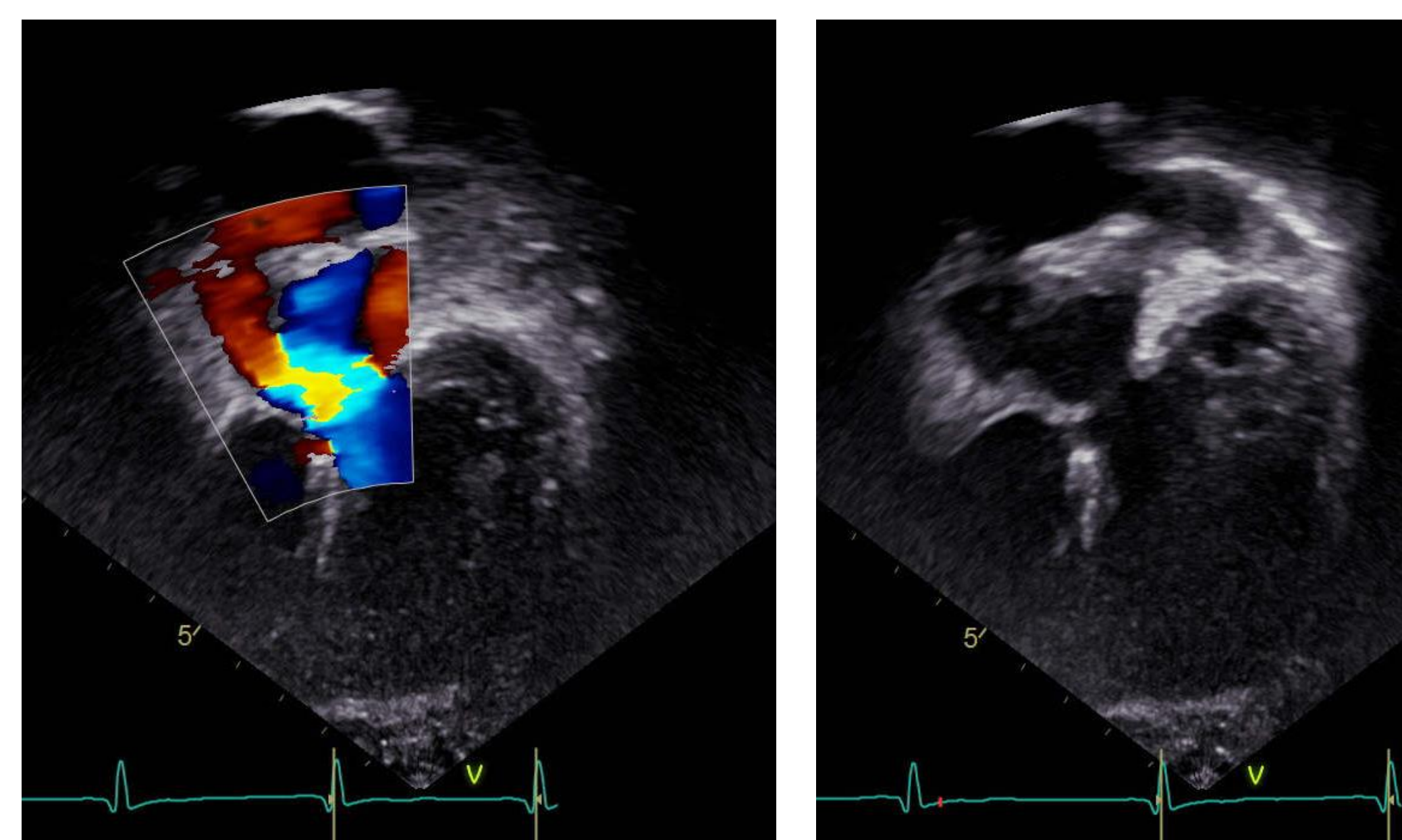
CLINICAL PRESENTATION

7 months old:
VSD Patch closure & subaortic tunnel resection

3 years old:
Recurrent subaortic stenosis leading to repeat surgical resection

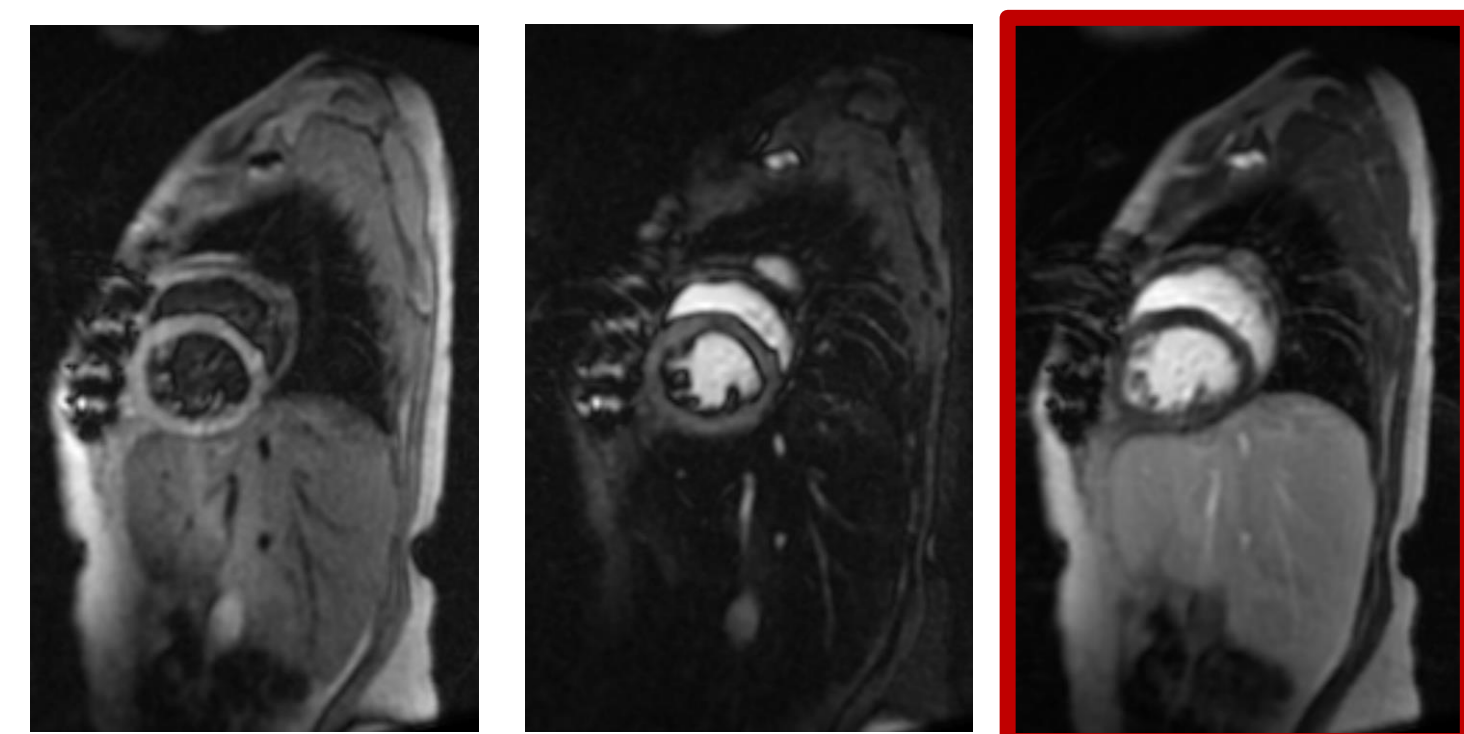


5 years old:
Presented for routine follow up



Echo: Mild-moderate aortic valve regurgitation. Outpouching of the lateral border of the left ventricular outflow tract (LVOT).

ROLE OF CARDIAC MAGNETIC RESONANCE IMAGING

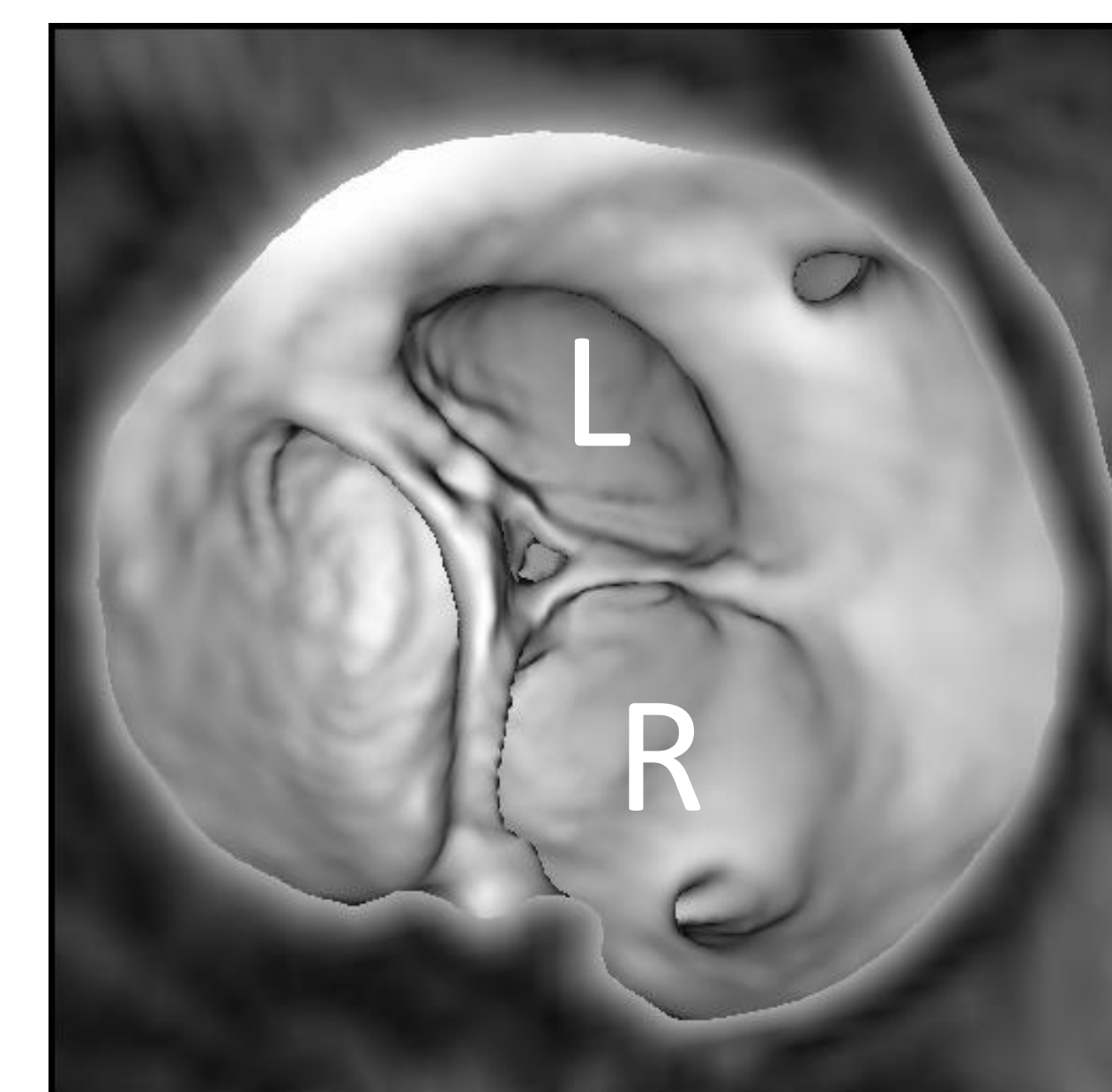


MRI TECHNIQUE:

- 3T Platform (GE 750W; 32 channel coil)
- Ferumoxytol Contrast
- Anesthesia
- Inversion Recovery Fast Gradient 3D whole heart pulse sequence
- Inversion Recovery Time: 285 ms

Findings on ferumoxytol-enhanced 3D whole heart MRI

- Characterized the unusual LVOT pseudoaneurysm and its relationship to adjacent structures
 - Dimensions:** 2.1 cm x 2.3 cm
- Left anterior descending coronary artery is immediately lateral to the aneurysm
- Superior-inferior relationship of the right and left ventricles
- Moderate to severely dilated left ventricle with normal left ventricular systolic function
 - LVEDV: 135 mL, LVEDVi: 120 mL/m², z:+3.9
 - LVEF: 59.2%

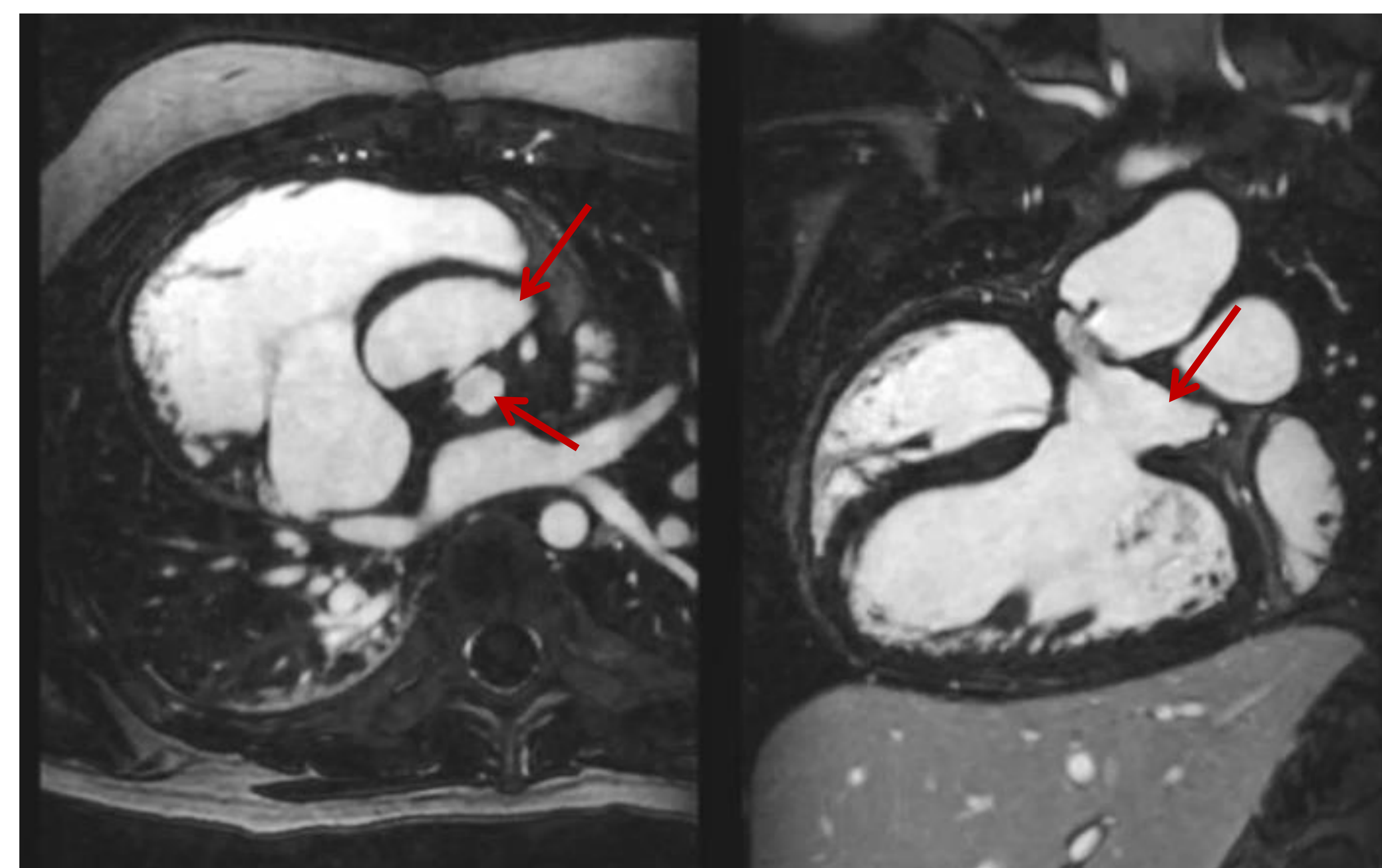


Moderate-severe aortic valve regurgitation

- 39% by phase contrast
- 45% by stroke volume

Mechanism

- Prolapse of Left (L) & Right (R) leaflets
- Central coaptation defect



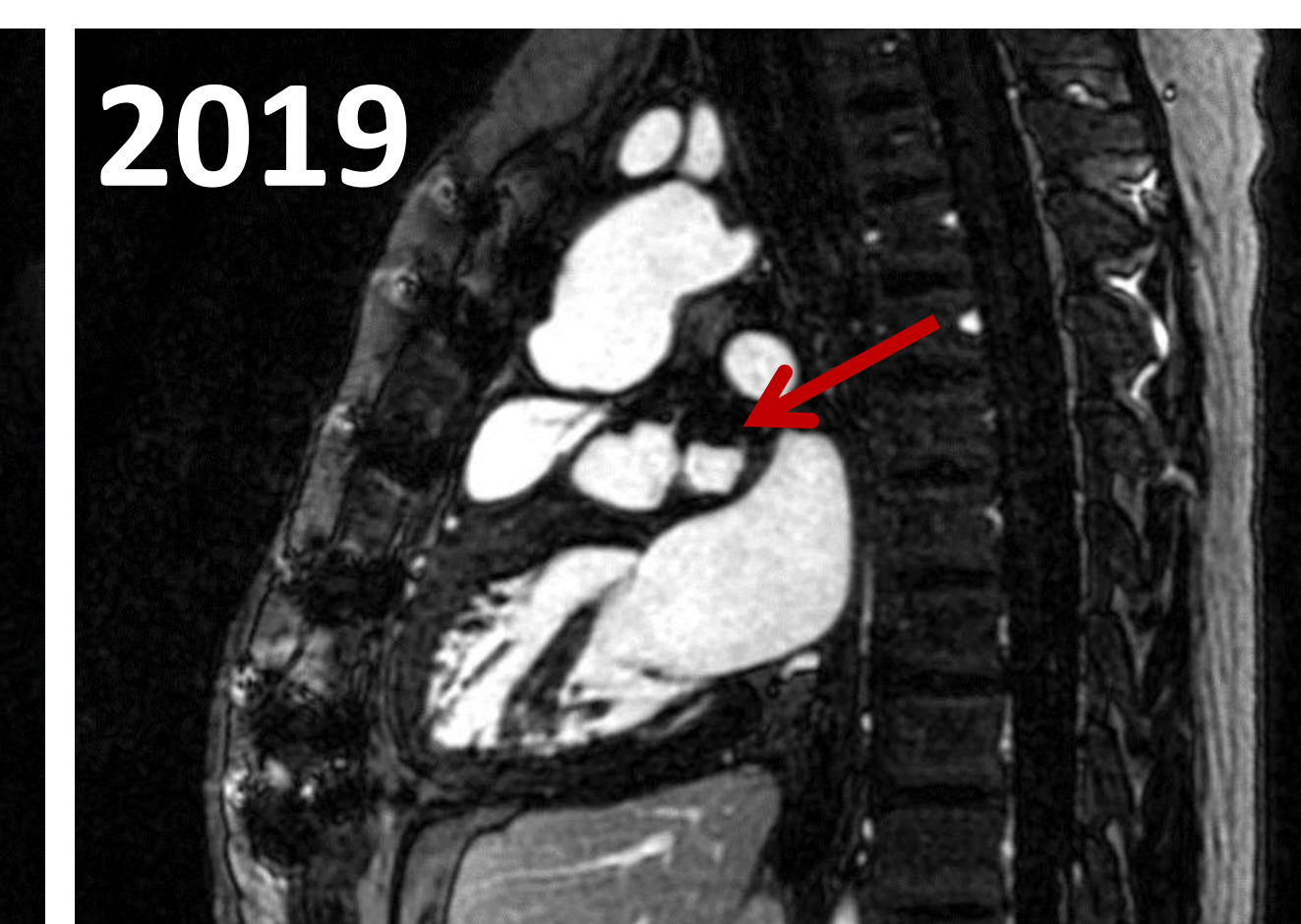
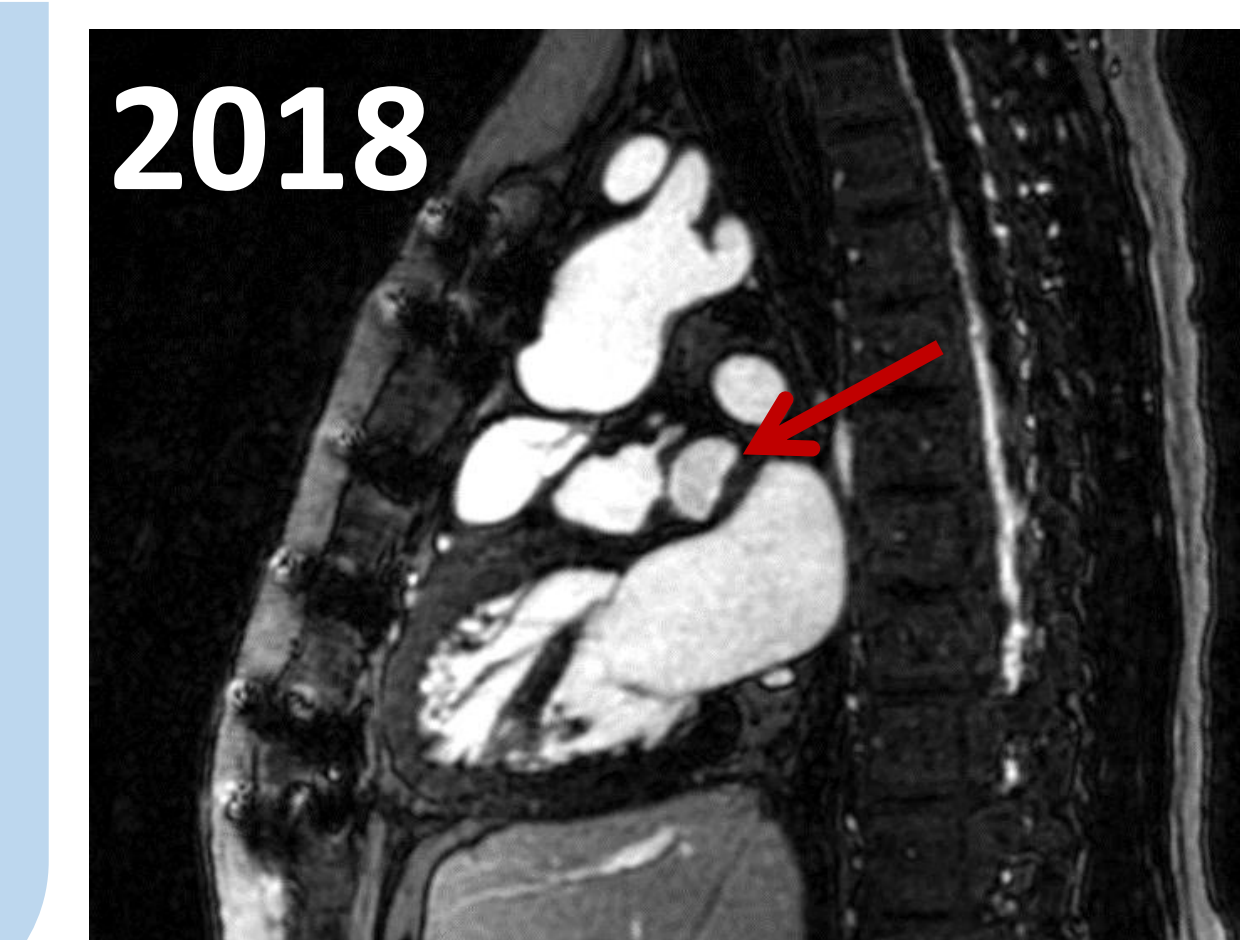
There is a large LVOT pseudoaneurysm with posterior extension. The left ventricle is dilated with fine trabeculations.



Flexible 3D Printed Model
Printer: Stratasys J750
Clearly demonstrates the LVOT pseudoaneurysm and its relationship to the aortic valve and left coronary artery.

SERIAL SCANS

New Filling Defect
→ Interval thrombus development within the LVOT pseudoaneurysm



KEY LEARNING POINTS

ANATOMIC DEFINITION

Comprehensive characterization of complex congenital heart disease

HIGH RESOLUTION

Clear visualization of small structures including coronary ostia and valve leaflets

COMPREHENSIVE

Thorough analysis of ventricular function and flow