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

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BACKGROUND

CLINICAL PRESENTATION

ROLE OF CARDIAC MAGNETIC RESONANCE IMAGING

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

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%

SERIAL SCANS
- New Filling Defect
- Interval thrombus development within the LVOT pseudoaneurysm
- Present for routine follow up

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

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

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

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