

Welcome to the Cardiovascular Imaging Team! As this is a very brief introduction to advanced cardiac imaging, the amount of dictation may be minimal, but there is plenty to be involved in and learn! Our goal is to show you what advanced imaging in pediatric cardiovascular disease is about – clinical and imaging considerations (how/when), imaging techniques, post-processing, and use of imaging biomarkers in clinical decision-making.

During the rotation, you will:

1. Complete the following module for basic CMR sequences, including the post-test, if you have not done a rotation in cardiac MRI before (or if you need a brush up):  
<https://introductiontoradiology.net/courses/rad/CardiacMR/>
2. Follow a couple cases at the MRI scanner. The attending will choose case(s) to watch, show you where the scanner is, and introduce you to our talented cardiac techs.
3. Go to the CT scanner for all cardiac CTs. We will walk you through our thought process when thinking about ECG-gating/triggering, contrast dose, timing, and radiation exposure.
4. Complete the cardiac modules on Cleveland Clinic's Pediatric Radiology website (this is under construction recently): [Cleveland Clinic Healthcare Education: Log in to the site \(ccf.org\)](https://www.clevelandclinic.com/healthcare-education)
5. Read and apply concepts from reading material below to scans interpreting this week and/or those in the teaching file (when it becomes available). Please check the schedule for indications of each study and work with the attending to select what will be most relevant to read and when to read it.

**In general:**

The European Association of Cardiovascular Imaging has some super pocket guides that you can download here: [https://www.esccardio.org/Sub-specialty-communities/European-Association-of-Cardiovascular-Imaging-\(EACVI\)/Research-and-Publications/CMR-Pocket-Guides](https://www.esccardio.org/Sub-specialty-communities/European-Association-of-Cardiovascular-Imaging-(EACVI)/Research-and-Publications/CMR-Pocket-Guides). The congenital CMR pocket guide PDF is in the folder.

Caffey's Pediatric Diagnostic Imaging (13<sup>th</sup> edition is most recent), Chapters 63 – 82 most relevant. It is available through Northwestern Galter Library in electronic form. There might also be a copy around in the reading room. The attending can help you decide where to start:

63. Cardiovascular Anatomy and Segmental Approach to Imaging of Congenital Heart Disease
64. Pediatric Echocardiography
65. Chest Radiography in Pediatric Cardiovascular Disease
66. Pediatric Cardiothoracic Computed Tomographic Angiography
67. Magnetic Resonance Imaging for Congenital Heart Disease
68. Pediatric Cardiac Catheterization and Electrophysiology
69. Surgical Considerations for Congenital Heart Disease
70. Prenatal Imaging and Therapy of Congenital Heart Disease
71. Abnormal Pulmonary and Systemic Venous Connections
73. Left Heart Lesions
74. Right Heart Lesions
75. Conotruncal Anomalies
76. Congenital Anomalies of the Thoracic Great Arteries
77. Coronary Artery Disease in Children
78. Syndromes and Chromosomal Anomalies
79. Myocardial, Endocardial, and Pericardial Diseases
80. Cardiac and Pericardial Tumors
81. Cardiovascular Involvement by Systemic Diseases
82. Acquired Diseases of the Thoracic Great Vessels

Although not pediatric specific, Radiographics now posts "top ten" lists by year:

[https://pubs.rsna.org/page/radiographics/rgteam/top10\\_cardiac](https://pubs.rsna.org/page/radiographics/rgteam/top10_cardiac) which you can search for relevant topics as cases come up

The Cardiac lectures from STR (Society of Thoracic Radiology) are pretty useful: [https://thoracicrad.org/?page\\_id=1451](https://thoracicrad.org/?page_id=1451)

NASCI also has some talks on congenital heart disease: <https://nasci.org/education/547-2/>

Other articles include:

**Segmental approach to complex congenital heart disease:**

Lapierre C et al. Segmental Approach to Imaging of Congenital Heart Disease. Radiographics 2010.

<https://pubs.rsna.org/doi/full/10.1148/rg.302095112>

Shallert EK et al. Describing Congenital Heart Disease by Using Three-Part Segmental Notation. Radiographics 2013.

<https://pubs.rsna.org/doi/10.1148/rg.332125086>

**Tetralogy of Fallot:**

Ordovas KG et al. Cardiovascular MR Imaging after Surgical Correction of Tetralogy of Fallot: Approach-Based Understanding of Surgical Procedures. Radiographics 2013. <https://pubs.rsna.org/doi/10.1148/rg.334115084>

**Common surgeries:**

Gaca AM et al. Repair of congenital heart disease: a primer – parts 1 & 2. Radiology 2008. See PDF.

**Vascular Rings:**

Backer CL et al. Vascular Rings. Seminars in pediatric surgery 2016;25(3):165-75. See PDF.

**Bicuspid aortic valve:**

Ko SM et al. Bicuspid Aortic Valve: Spectrum of Imaging Findings at Cardiac MDCT and Cardiovascular MRI. AJR 2012;

198:89-97. <https://www.ajronline.org/doi/10.2214/AJR.10.6084>

**Coronary arteries:**

Agarwal PP. Anomalous Coronary Arteries That Need Intervention: Review of Pre- and Postoperative Imaging Appearances. Radiographics 2017. <https://pubs.rsna.org/doi/10.1148/rg.2017160124>

Saling LJ et al. Abnormalities of the Coronary Arteries in Children: Looking beyond the Origins. Radiographics 2017.

<https://pubs.rsna.org/doi/10.1148/rg.2017170018>

**Pulmonary veins:**

Vyas HV et al. MR Imaging and CT Evaluation of Congenital Pulmonary Vein Abnormalities in Neonates and Infants.

Radiographics 2012. <https://pubs.rsna.org/doi/full/10.1148/rg.321105764>

**Myocarditis:**

Gannon MP et al. State of the art: Evaluation and prognostication of myocarditis using cardiac MRI. JMRI 2019. See PDF.

Banka P et al. Cardiovascular magnetic resonance techniques and findings in children with myocarditis: a multicenter retrospective study. JCMR 2015. See PDF.

**T2\* and iron overload states:**

Rigsby C. SPR presentation 2016. See PDF

Wood JC. Guidelines for quantifying iron overload. Hematology 2014.

<http://asheducationbook.hematologylibrary.org/content/2014/1/210.full>

**Common radiographic appearance of congenital heart disease:**

Ferguson EC et al. Classic Imaging signs of Congenital Cardiovascular Abnormalities. Radiographics 2007.

<https://pubs.rsna.org/doi/full/10.1148/rg.275065148>

(Note: RSNA access aka access to Radiographics is free for trainees as of now, but you do need to sign up for a log in)