Cardiac MRI: 101

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Joseph J. Blake, M.D.
Kettering Network Radiologists, Inc.

Example Images
CONTRAST, +/- PERFUSION IMAGES, POST-IMAGES
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2013 GLOBAL MEDICARE COST

1 Cardiac MRI = 0.37 ounces of Gold

What do we need?

- MRI Scanner
  - At KMC = 1.5T Siemens Avanto with Syngo MR B17
  - Basic Cardiac and ECG integration, Parallel Imaging
  - Rapid gradient imaging

- Cardiac/Torso Coil

Sequences

- Alphabet Soup
  - Siemens: HASTE, TruFISP, GRE
  - Philips: Single Shot, Balanced FFE, FFE
  - GE: SSFSE, FIESTA, GRE
- Dark Blood
- Bright Blood
- Phase Contrast
  - Velocity Encoding (VENC)
- Post Contrast
  - Vist
- Myocardial Delayed Enhancement (MDE)

Post-Processing
Gadolinium Contrast

- 18g IV
- 0.2 mmol/kg (double dose)
- Hand or slow injector
- Flush with 10mL Saline
- 10 Minute Delay (in-between protocol)
  - MDE= Myocardial Delayed Enhancement (aka LGE)

Benefits of Cardiac MRI

- **RADIATION EXPOSURE**: No risk of ionizing radiation
- **Tissue characterization**
- Non-invasive
- Excellent contrast and spatial resolution
- Functional information, both qualitative and quantitative
Contraindications

- NSF
- Cannot Lay Flat
- Pacers/ICD/Metal
  - Sternal wires - ok
  - IVC filters - ok
  - Valve replacements - ok

Cardiac MRI

- Perfusion
- Dobutamine Stress
- Viability
- Scar and Survival
- Infiltrative Disease and Other Considerations
- CMR angiography

Perfusion Cardiac MRI

Superior diagnostic performance of perfusion-cardiac magnetic resonance versus SPECT to detect coronary artery disease. The accuracies of the multicenter multicenter MB-MRI study to determine the accuracy of the perfusion-CMR techniques. Comparison of CMR with other techniques.
“Although CMR is widely used for determination of anomalous origin of the coronary arteries, there are relatively few centers where coronary CMR is performed, and considerable research needs to be done before coronary artery MRI is a reasonable tool for the complete evaluation of the coronary arteries and accurate assessment of coronary artery bypass graft status.”

2010. AHA. Expert Consensus Document on Cardiovascular Magnetic Resonance Imaging: Radiology and Cardiology Perspective

Christoph A. Nienaber, MD