

— THE HEART **SUMMIT** — 2018

ARKANSAS HEART HOSPITAL®

Non-Contrast MR Angiography & Cardiac MRI

Adam L. Sipe, M.D.

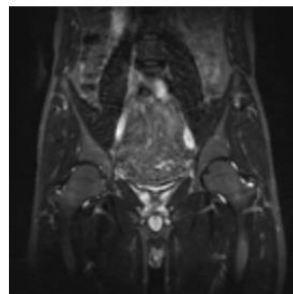
Goals

- Introduce the new Toshiba Vantage Titan 1.5 Tesla MRI
- Illustrate scanner's robust non-contrast MRA ability
- Demonstrate cardiac MRI
 - Anatomy
 - Disease processes

Non-contrast MRA

- Anatomy is Key
- Great for patients with renal insufficiency
 - New FDA warning on Gadolinium
- Time of Flight (TOF) MRA
- Phase Contrast MRA
- Fresh blood imaging technique (FBI)
 - Fast
 - STIR (fat suppression)
 - ECG gated
 - Arterial and Venous flow
 - Subtract venous from arterial

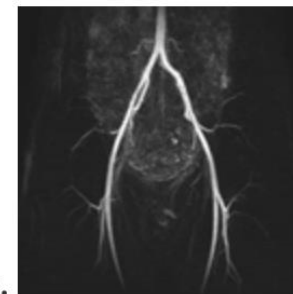
Base image for FBI



Cross-sectional images with enhanced blood flow are acquired. The scanning procedure is the same as in conventional MRI exams.

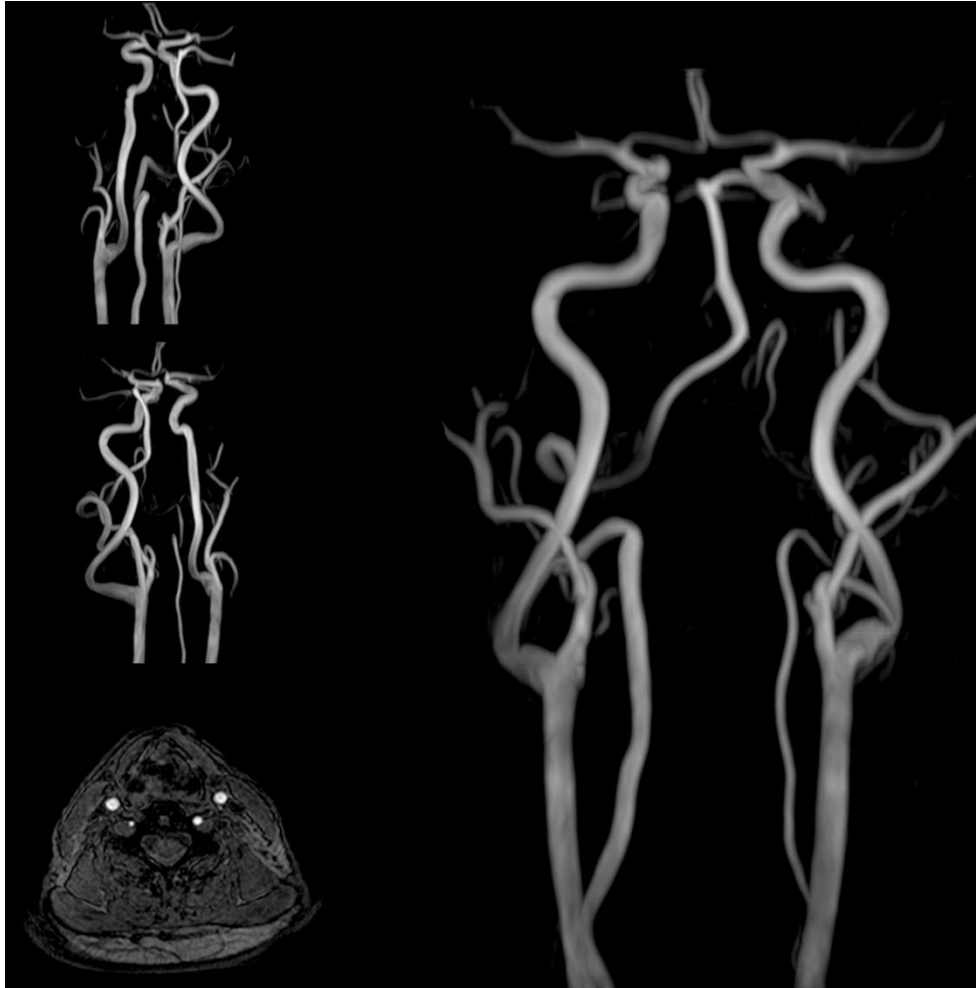


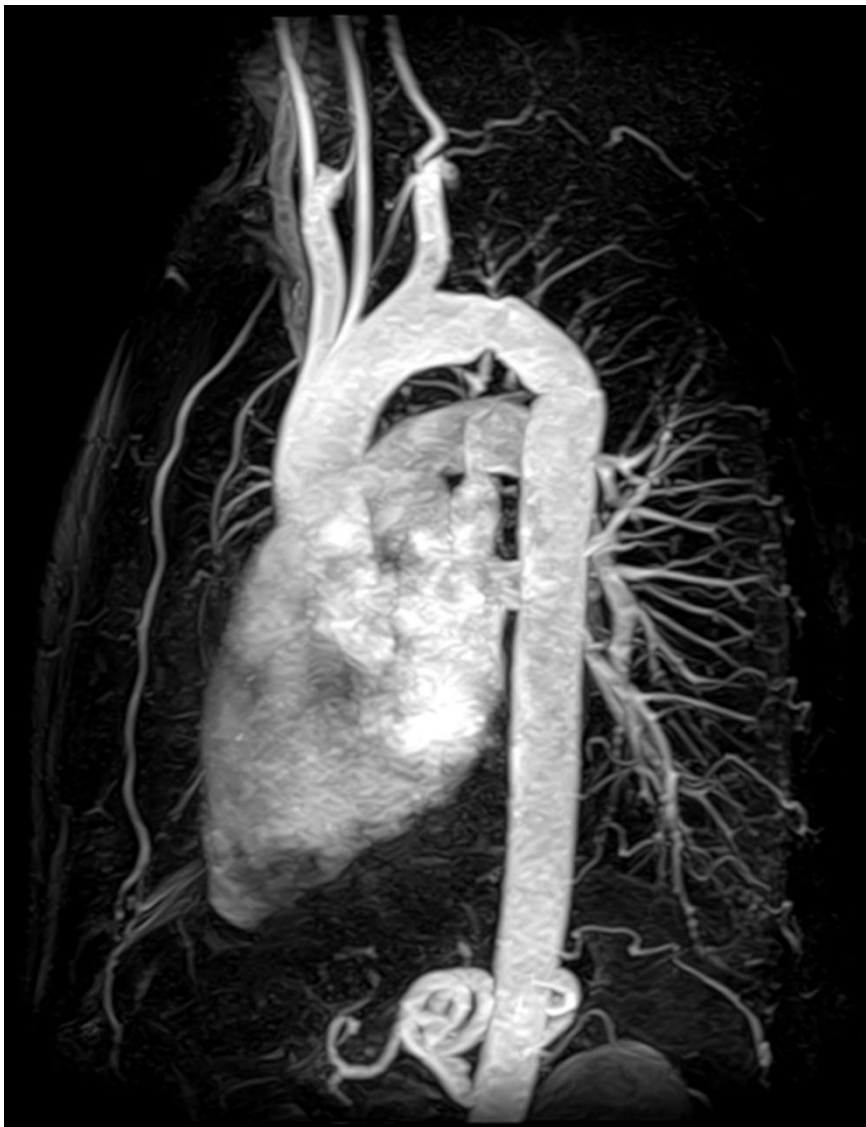
FBI image



By applying 3D processing, the entire vascularization can be obtained. The vessels can be observed in detail from different directions.

MRA Neck





Sagittal MRA “Candy Cane”
Aorta



3D surface render

Aortic Arch

Pulmonary Vasculature MRA



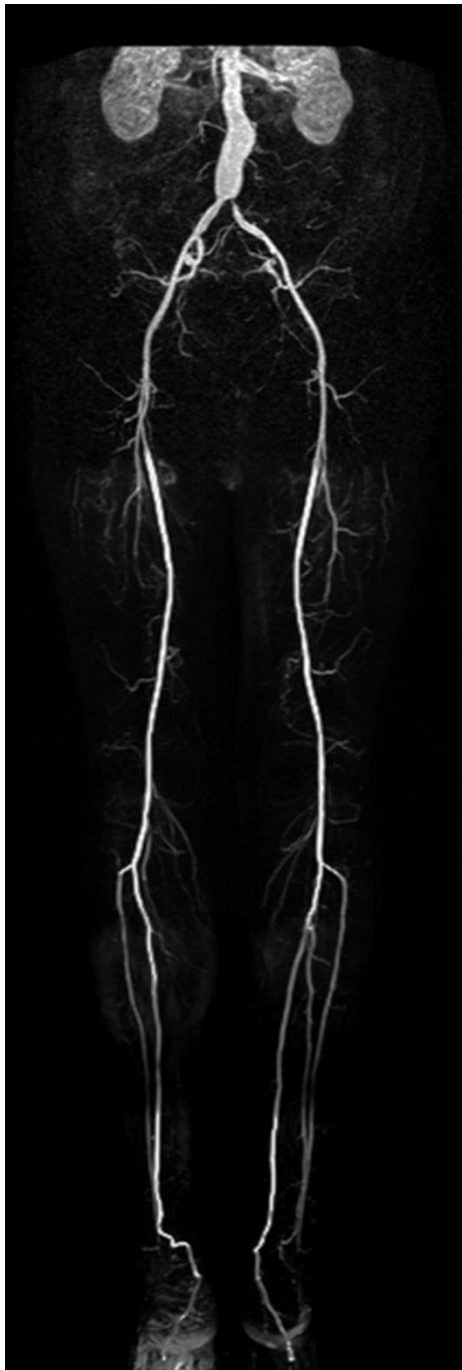
Renal/Splanchnic arteries



3D MIP



2D MIP

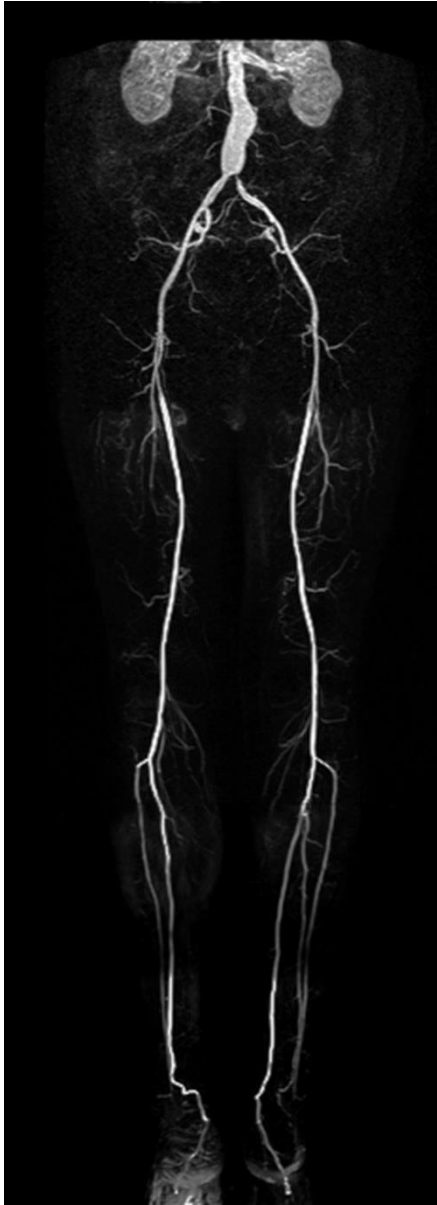


Left:
FBI MRA run off

Right:
FBI MRA run off
VS.
Conventional Angiogram



Run-off



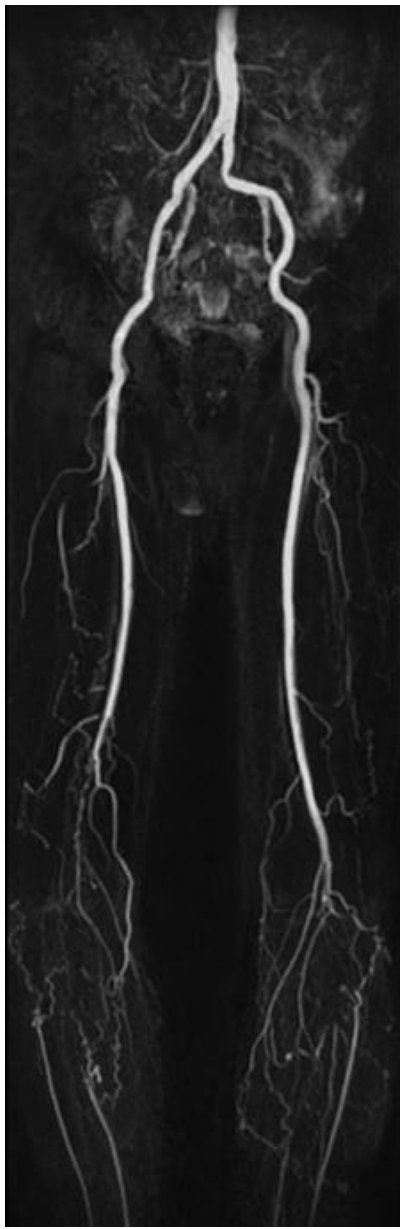
Normal Run-Off



Left SFA Occlusion



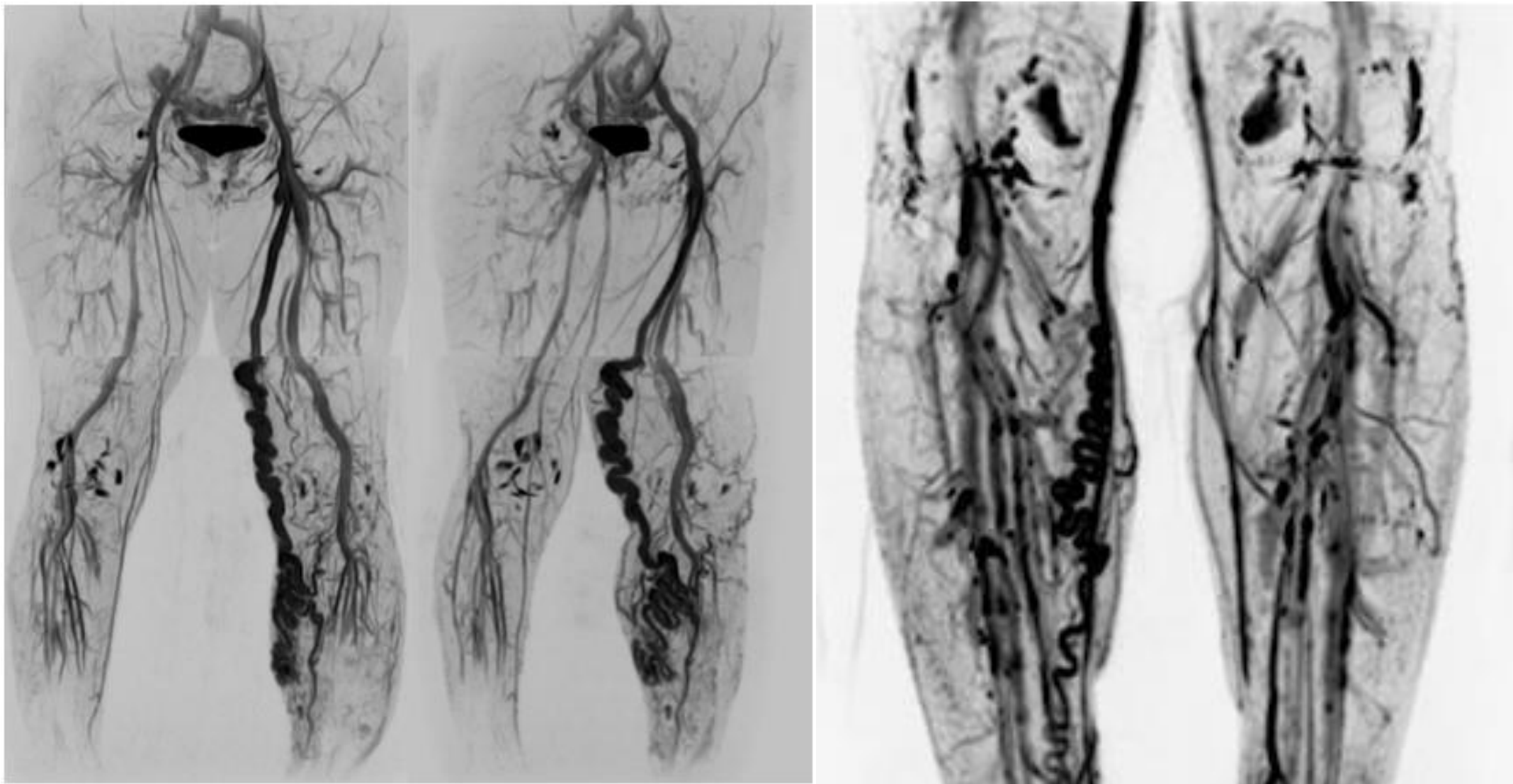
Axillary-Femoral
Bypass



Right SFA
Left Popliteal Occlusion

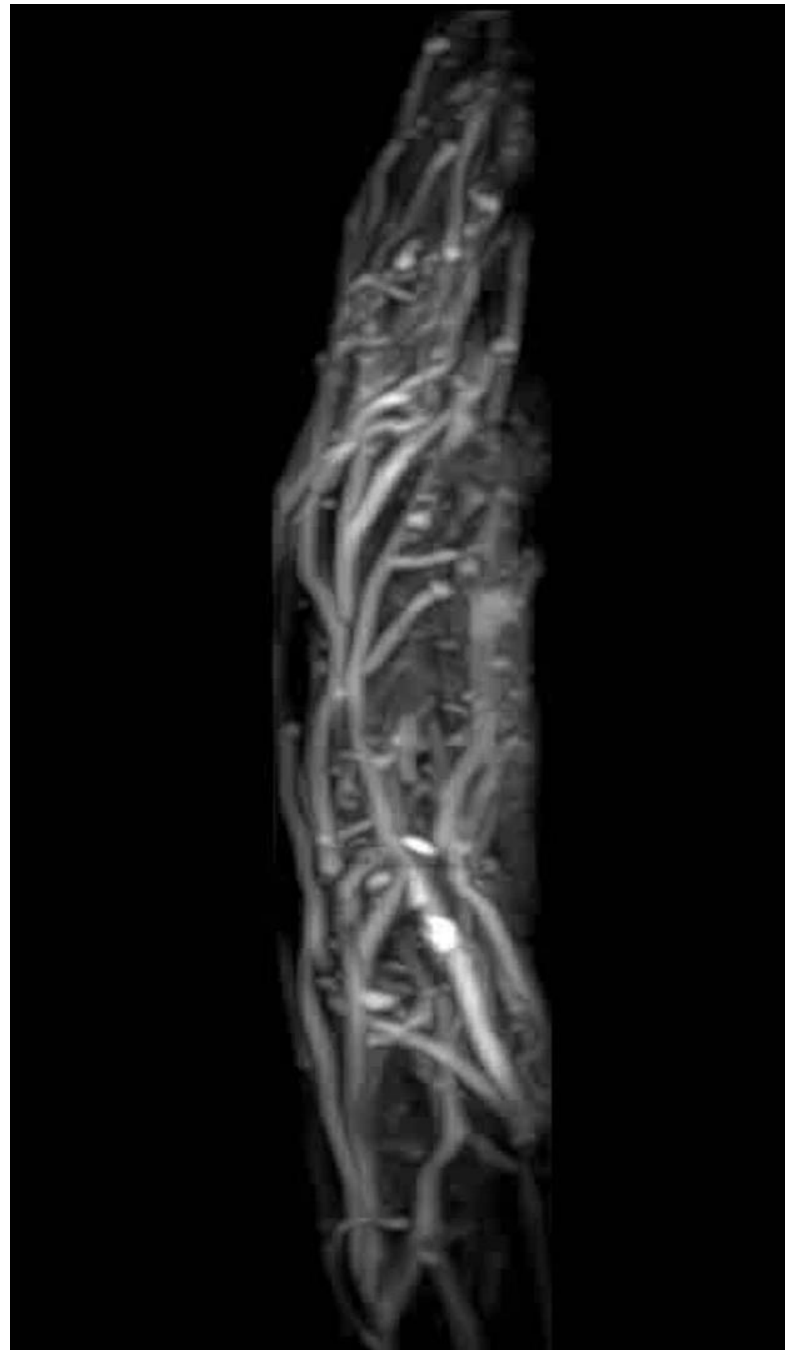


Normal Run-Off



Venous Varicosities

3D Surface Render
Foot

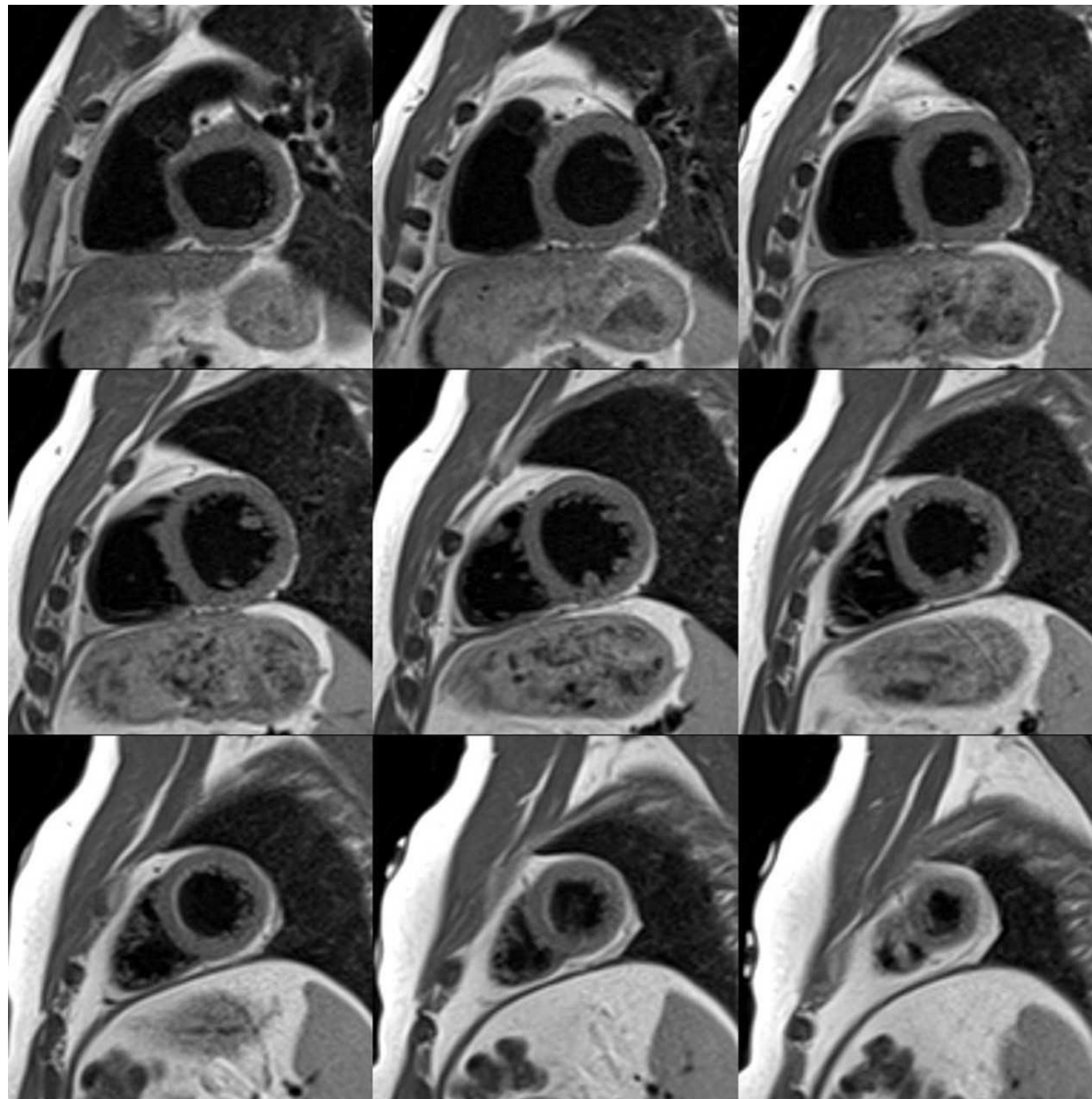


3D MIP Hand

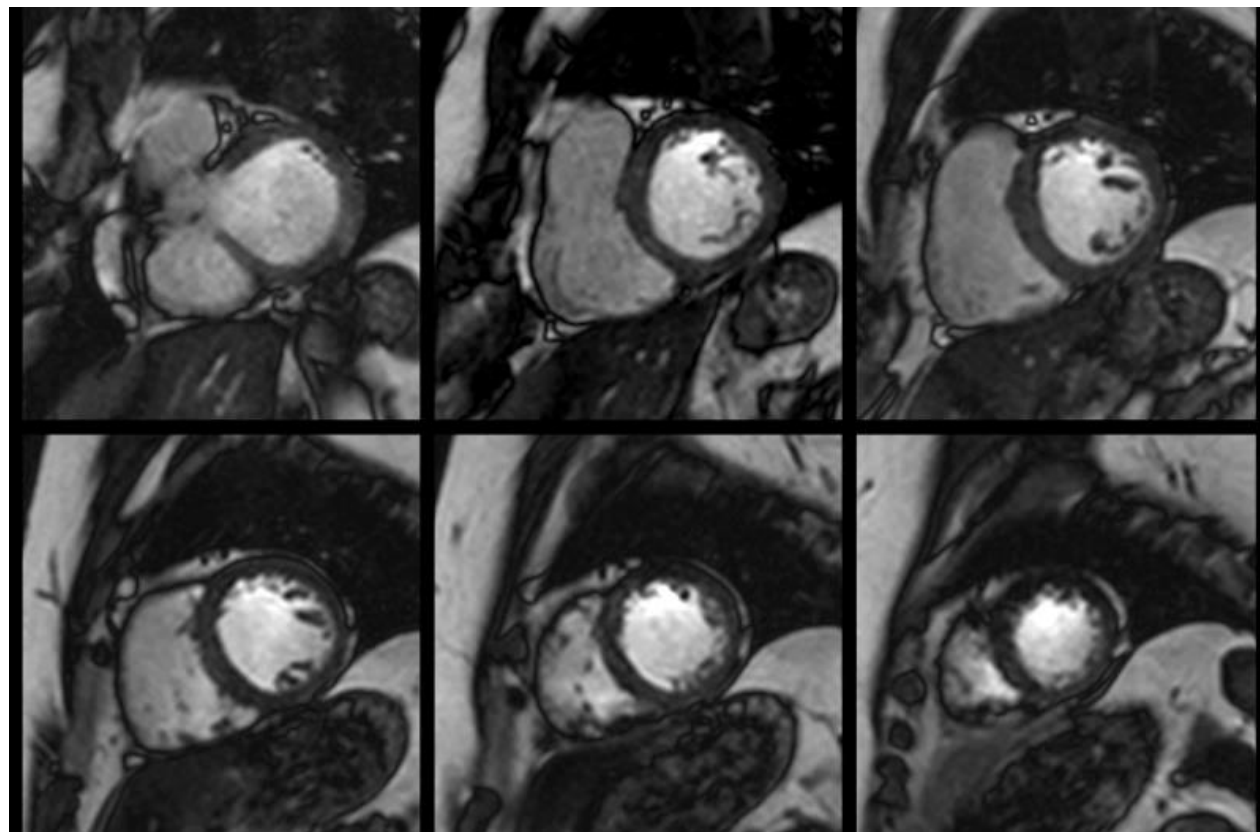
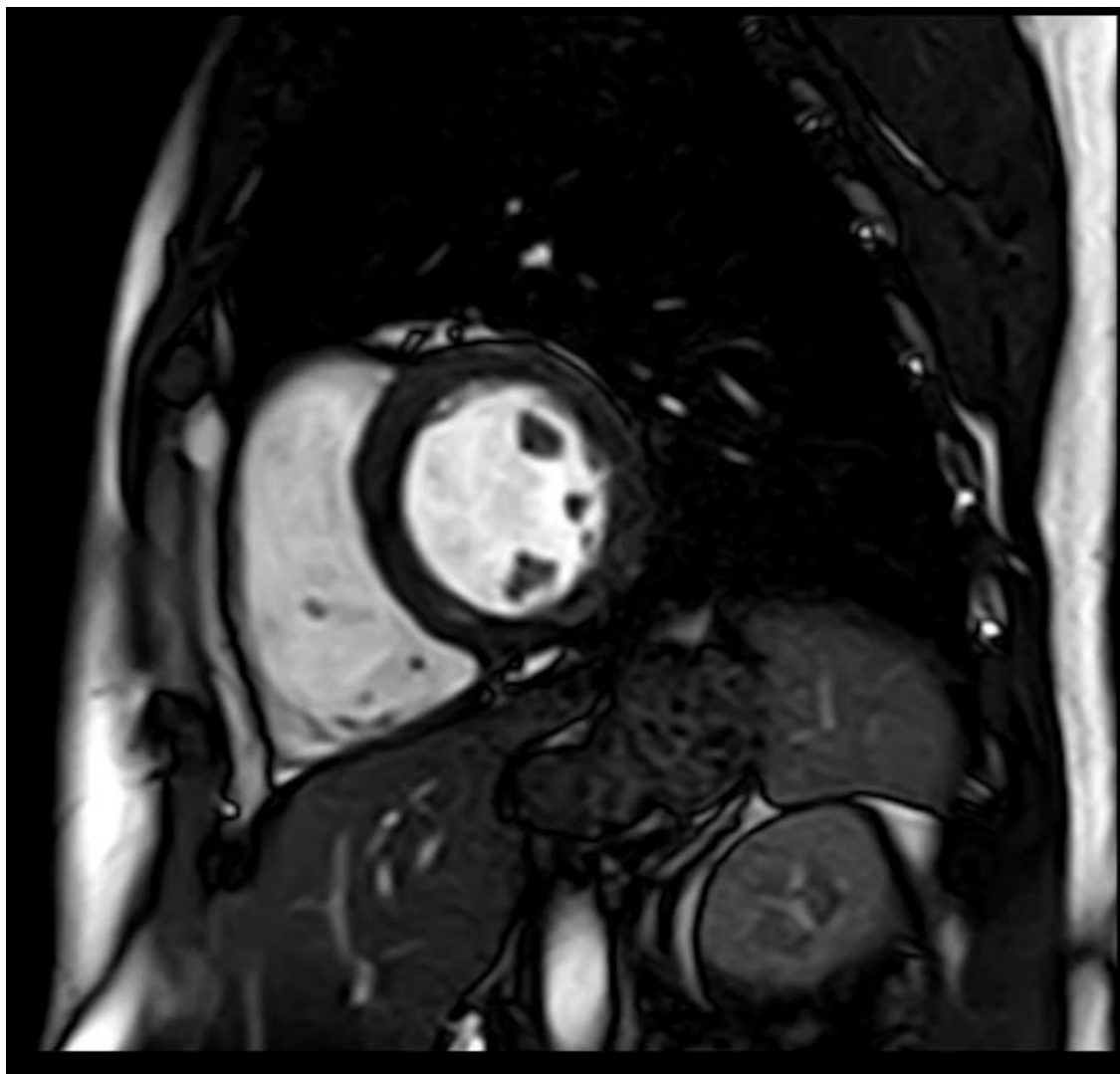
Cardiac MRI

- Anatomy
 - ASD
 - VSD
 - Tri vs. Bicuspid delineation
 - Myocardial wall thickness
- Cardiac masses
 - Myxomas
 - Thrombus
 - Tumors
- DCE
 - Ischemic vs. Non-Ischemic Cardiomyopathy
- Excellent tool for functional imaging
 - EF calculation
 - Shunt fractions using flow quantification
 - Myocardial motion
- Valvular pathology
 - Stenosis
 - Regurgitation
 - Valvular vegetation

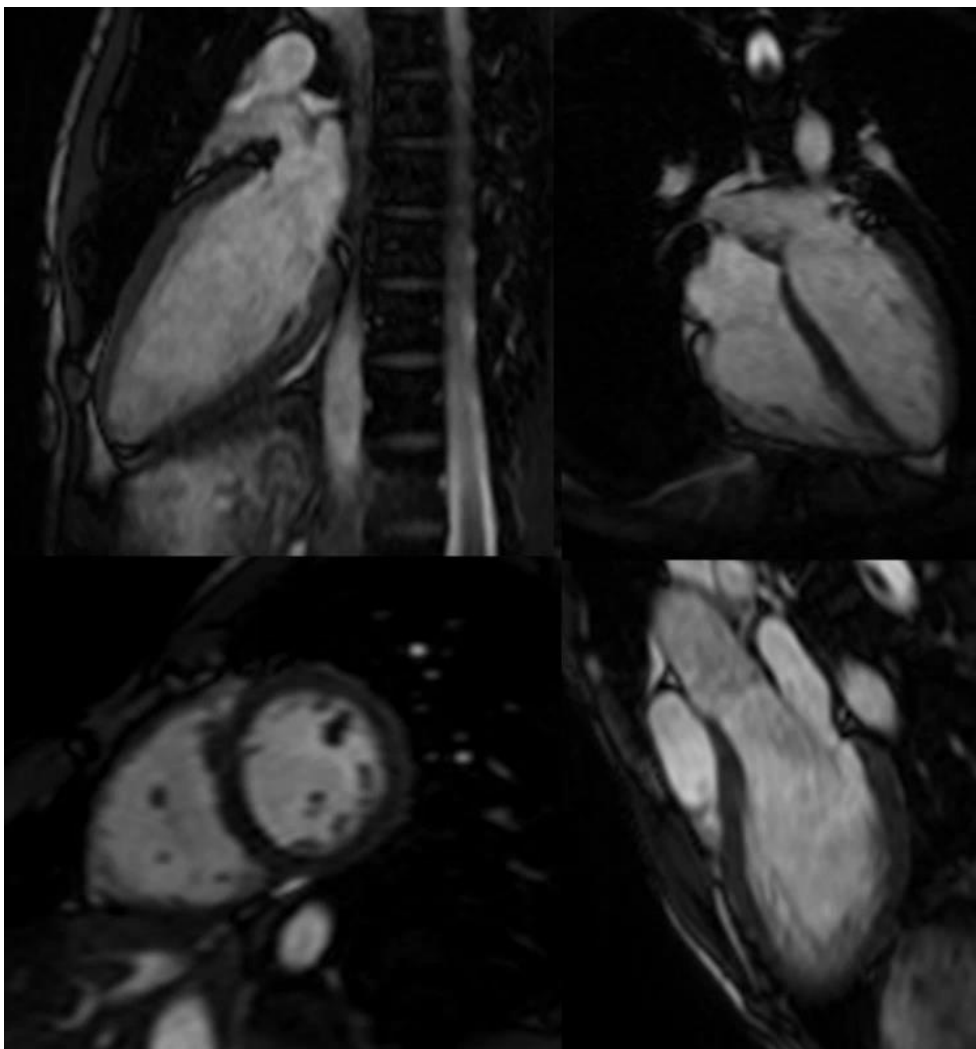
Short axis
Black Blood Imaging
Gated



Short Axis Cine Imaging

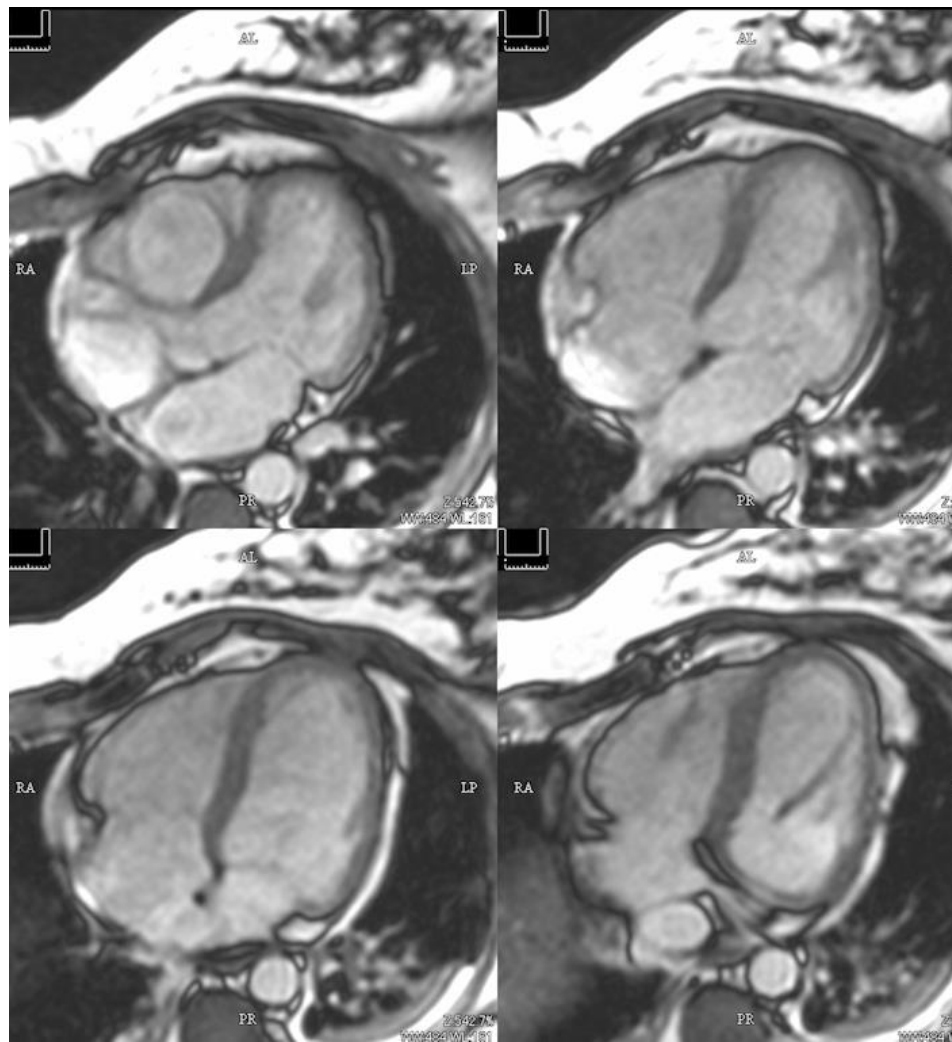


Cine Planes



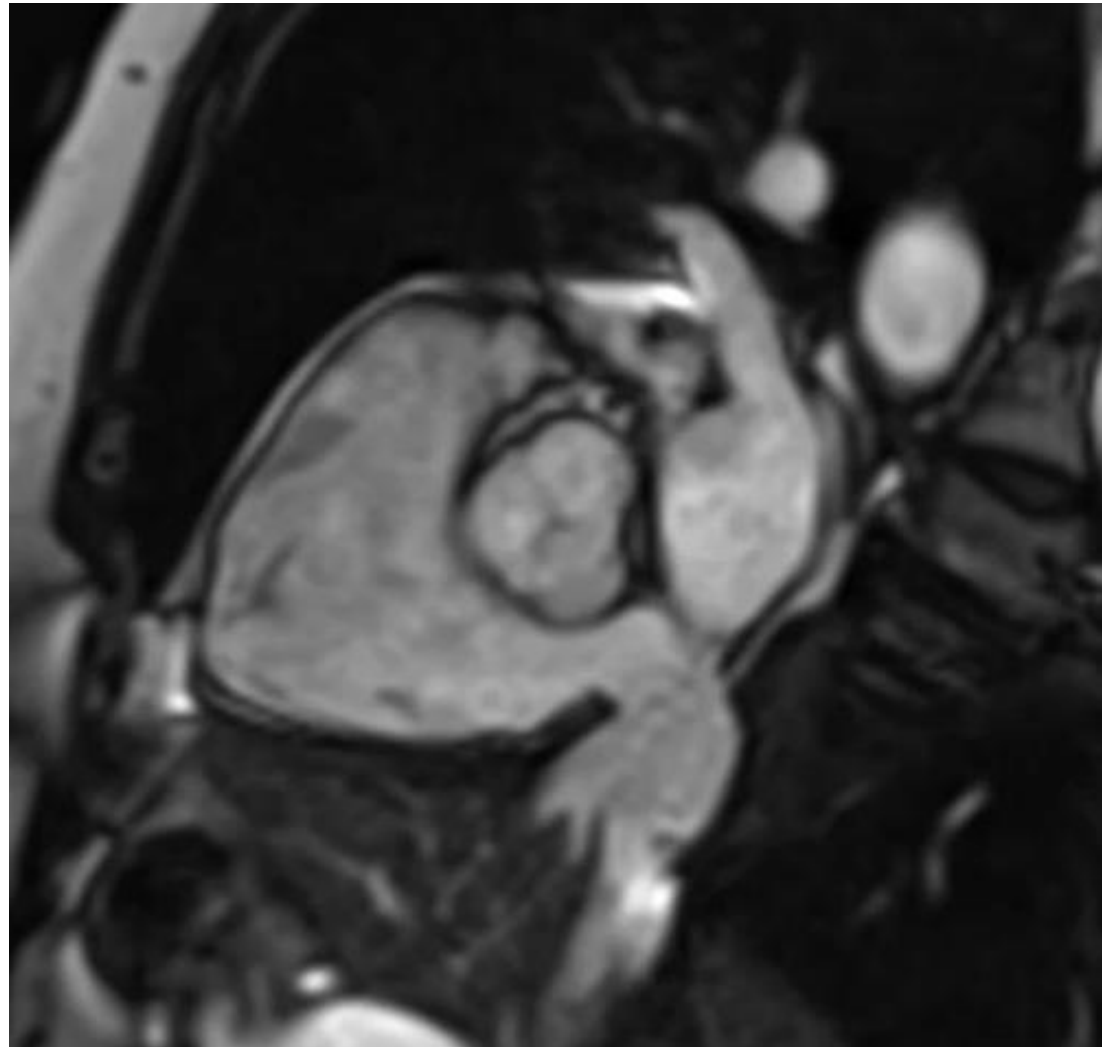
2-chamber long
2-chamber short

4-chamber off axis
LVOT View

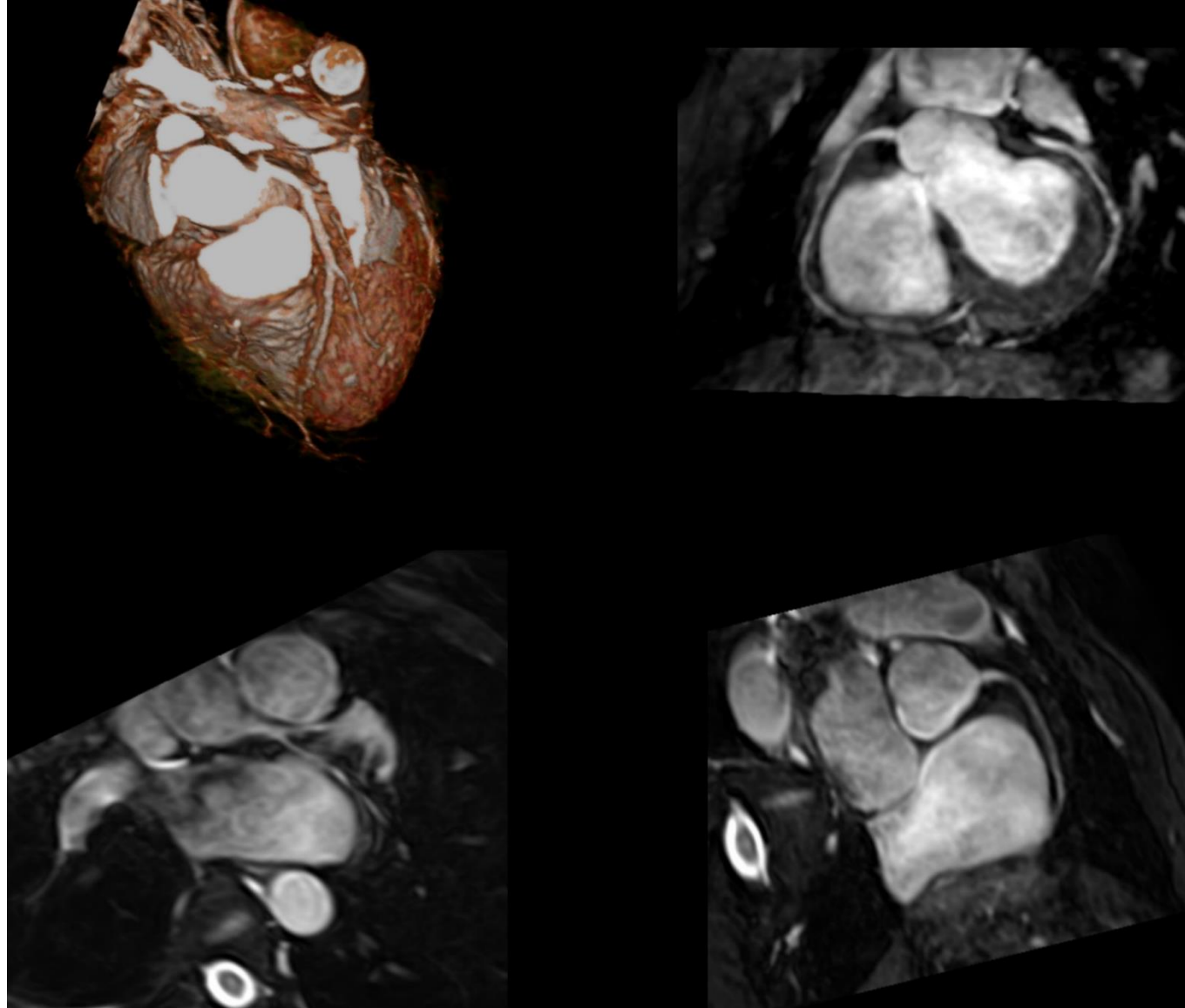


4-chamber stack

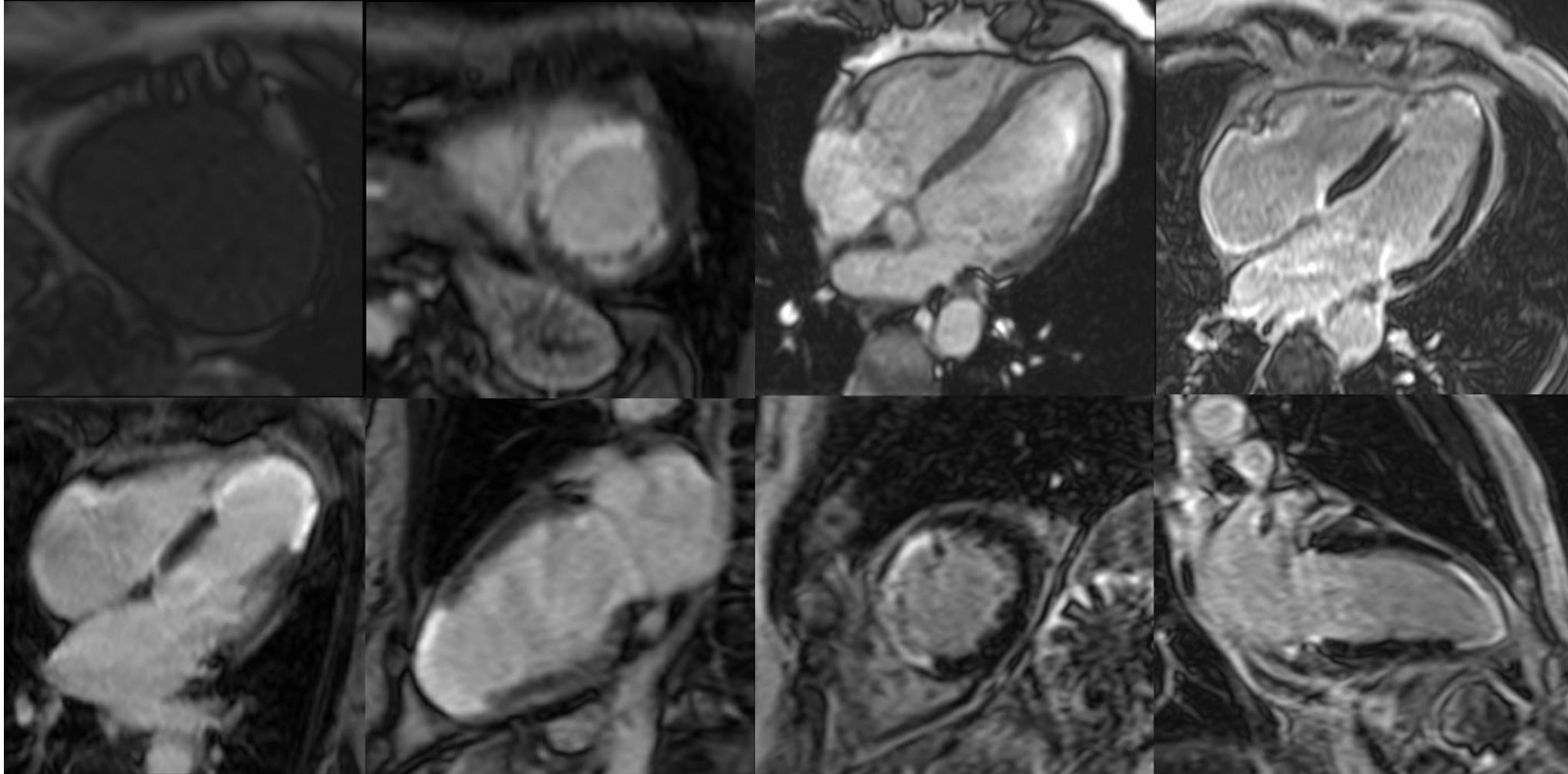
Aortic Valve



Coronary Anatomy



Ischemic Cardiomyopathy



Myocardial disease processes

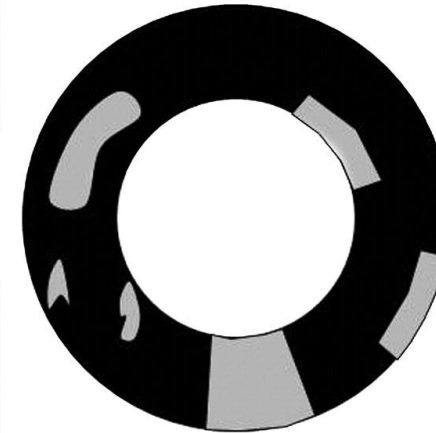
- Myocarditis
 - Lake Louise Criteria
 - T1 mapping
 - T2 mapping
 - DCE
- Eosinophilic Myocarditis
- HOCM
 - DCE
- Sarcoidosis
- Amyloidosis
- Noncompaction

Mesocardial

- Hypertrophic cardiomyopathy
- Dilated cardiomyopathy
- Pulmonary hypertension

Patchy

- Sarcoid
- Amyloid
- Myocarditis



Transmural

- Infarction (*most common*)
- Myocarditis, severe
- Sarcoid, chronic

Subendocardial

Vascular

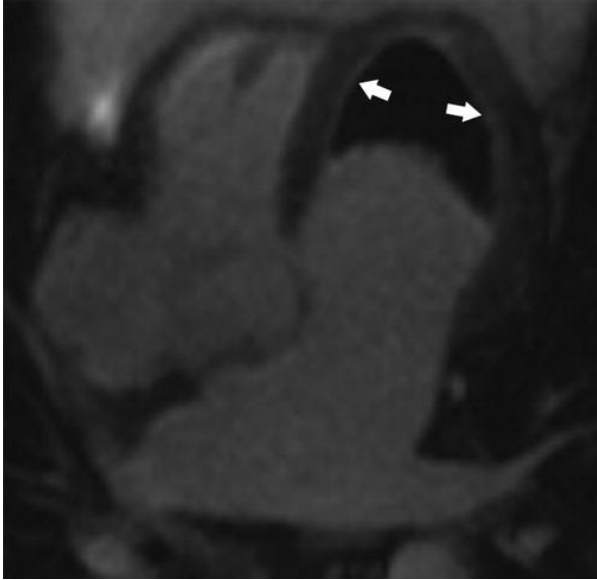
- Infarction

Non-vascular

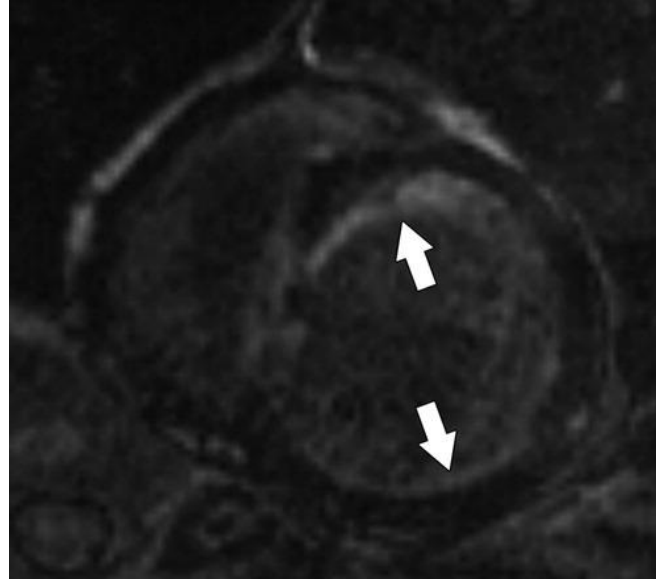
- Amyloid
- Hypereosinophilic syndrome
- Histiocytoid cardiomyopathy
- Cardiac transplant

Subepicardial

- Myocarditis (*most common*)
- Sarcoid



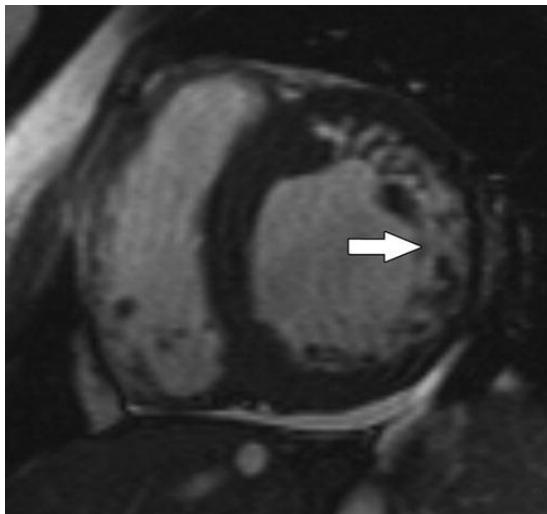
Eosinophilic Myocarditis



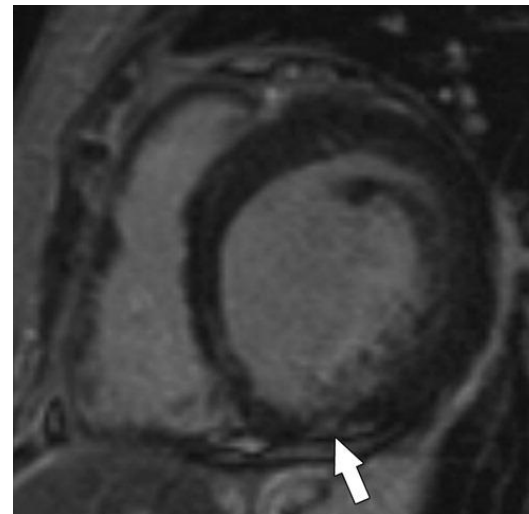
Amyloidosis



HOCM



Noncompaction



Sarcoid

Questions?

Thank you!



Reference

A Pattern-based Approach to Assessment of Delayed Enhancement in Nonischemic Cardiomyopathy at MR Imaging. Kristopher W. Cummings, Sanjeev Bhalla, Cylen Javidan-Nejad, Andrew J. Bierhals, Fernando R. Gutierrez, and Pamela K. Woodard. RadioGraphics 2009 29:1, 89-103

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