

Heart Failure

Presented by



Society for
Cardiovascular
Magnetic
Resonance

1 Background

Heart Failure (HF) can be caused by various etiologies. Accurate and timely diagnosis allows proper treatment and improves patient outcomes. CMR can also help assess response to therapies and stratify risk.

2 Why CMR

- High diagnostic accuracy due to excellent image resolution.
- Good image quality independent of body habitus.
- One-stop shop: morphology, function, and tissue characterization.
- No ionizing radiation.

3 Appropriate Use Criteria

*2022 AHA/ACC /HFSA Guideline †2020 SCMR Position Paper

Patients with inadequate echocardiography to assess LVEF

Class 1*

Diagnosis and management of HF

Class 2a*

Class 1†

Evaluate for possible ischemic heart disease in patients with HF

Class 2a*

In patients with HF and CAD who are candidate for revascularization, evaluate ischemia to guide coronary revascularization [stress MRI]

Class 2b*

* 2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure. Circulation. 2022;145:e895-e1032.



† Leiner T, et al. SCMR Position Paper (2020) on clinical indications for CMR. J Cardiovasc Magn Reson. 2020;22:76.

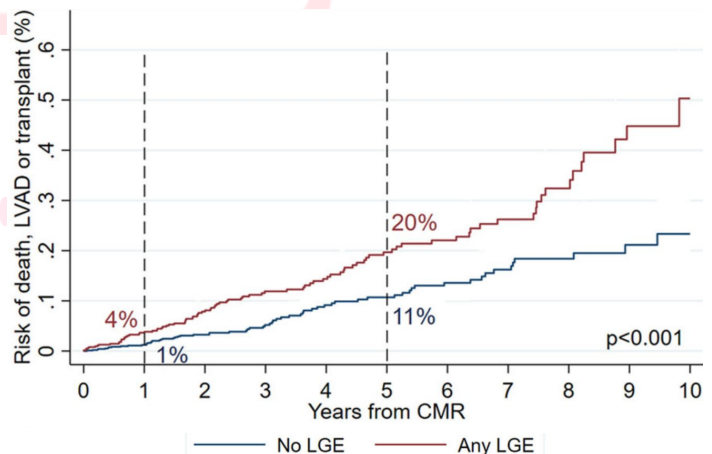


4 Reference

Composite Outcome of Death, Transplant, or LVAD Associated with LGE in DCM

A total of 1672 consecutive adults referred for the evaluation of DCM and at 12 institutions in 4 countries were studied. During a median follow-up of 2.3 (1.0–4.3) years, 160 patients experienced the primary composite outcome. Event rate was significantly higher in patients with LGE compared to those without LGE ($P < 0.001$).

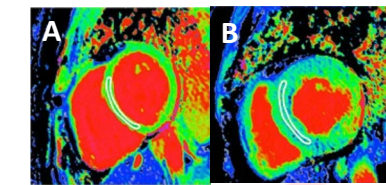
Alba AC, et al. Circ Cardiovasc Imaging. 2020;13:e010105.



Heart Failure

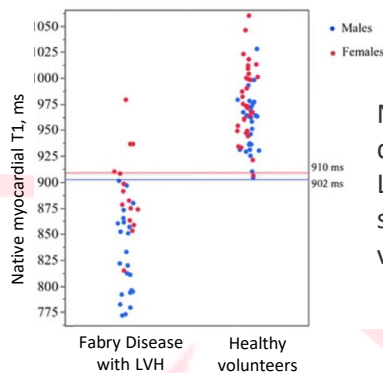
Native T1 Mapping in Fabry Disease

Pica S, et al. J Cardiovasc Magn Reson. 2014;16:99.



(A) Normal
(B) Fabry Disease
LVH Short native myocardial T1 (blue)

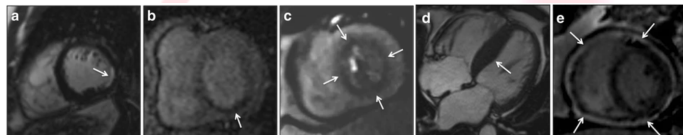
200 ms ↑ Normal 3000 ms



Native T1 in Fabry disease subjects with LVH was significantly shorter than healthy volunteers ($p < 0.0001$).

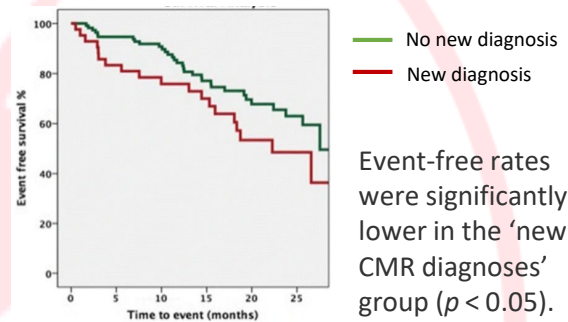
Diagnostic and Prognostic Utility of CMR in HFpEF.

Kanagala P, et al. J Cardiovasc Magn Reson. 2018;20:4.



CMR detected previously undiagnosed pathology in 27%. Examples of typical 'new diagnoses' are (a) MI, (b) Ischemia, (c) Microvascular dysfunction, (d) HCM, (e) Constrictive pericarditis.

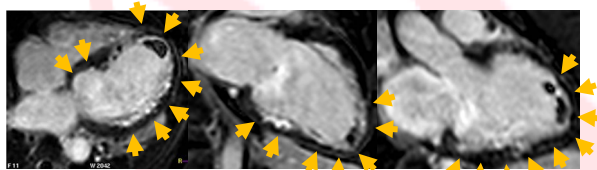
Composite endpoint of death and/or hospitalization



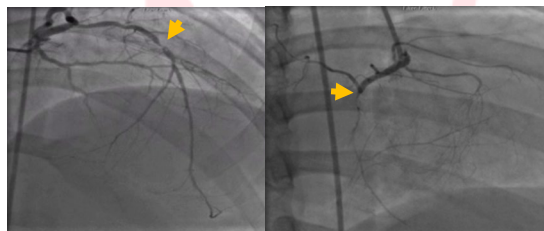
Event-free rates were significantly lower in the 'new CMR diagnoses' group ($p < 0.05$).

5 Images

New onset of HF in a young female.



There is extensive subendocardial enhancement, suggestive of 3 vessel disease. All considered viable.



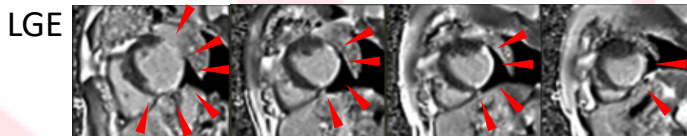
Severe stenosis in the mid LAD. Total occlusion in the proximal RAD accompanied collaterals, considered chronic.

Cases of SCMR #14-15

Karima Addetia, Elizabeth Retzer, Roberto M. Lang, Amit R. Patel
University of Chicago Medical Center, IL, USA

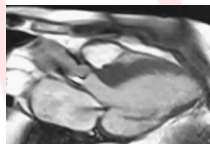
Newly developed HF.

What is appropriate management?



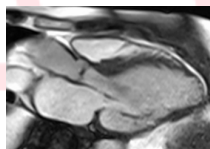
A large myocardial infarction with >75% transmural extension in the territory of RCA and LCx. All considered not viable.

Systole



Valvular quantification indicated moderate mitral regurgitation, moderate aortic stenosis, and mild aortic regurgitation.

Diastole



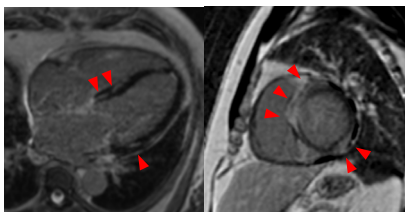
CMR directed to medical management over surgery.

Cases of SCMR #21-04

Kana Fujikura¹, Charles W. Benton¹, Calin V. Maniu²
¹National Heart, Lung, and Blood Institute, NIH, MD, USA; ²Johns Hopkins Community Physicians, MD, USA

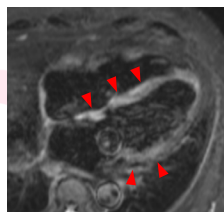
Progressive shortness of breath for 3 weeks, found to have complete heart block.

LGE



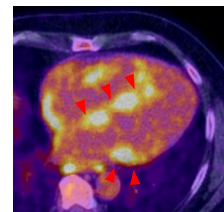
Nodular and patchy epicardial and midwall enhancement in the *in the basal anterior, septal, inferior, and anterolateral segments.*

T2-weighted imaging



High signal intensity in the segments correlated with LGE, indicating edema.

PET FDG



FDG uptake in the segments correlated to LGE, confirming active inflammation.

Cases of SCMR #23-04

Jonathan Hudson¹, Sorayya Kakhi², Yousef Daryani³
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