Elevated Troponin

WITHOUT Obstructive CAD

Presented by

Society for Cardiovascular Magnetic Resonance

1 Background

Myocardial infarction without obstructive coronary artery disease (MINOCA) has a broad differential diagnosis which includes acute myocarditis, takotsubo syndrome, and various non-ischemic cardiomyopathies. CMR can help differentiate between these etiologies.

2 Why CMR?

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

3 Guidelines and Appropriate Use Criteria

Acute Chest Pain

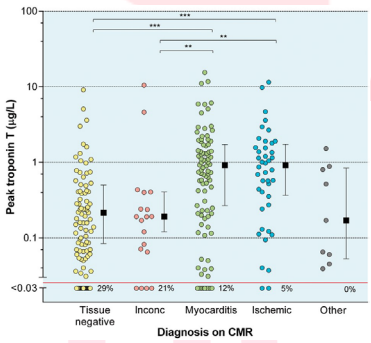
Clinically suspected myocarditis/myopericarditis	Class 1*†
Myocardial injury with nonobstructive coronary arteries on anatomic testing.	Class 1*
Establish alternative diagnosis in high-risk patients with positive troponin in whom obstructive CAD is excluded by CCTA or ICA.	Class 2a*

* 2021 AHA/ACC/ASE/CHEST/SAEM/SCCT/SCMR Guideline for the Evaluation and Diagnosis of Chest Pain. J Am Coll Cardiol. 2021;78:e187-e285.

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

4 References

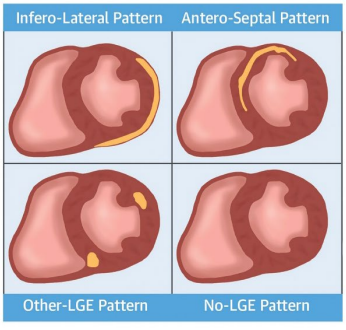
Clinically Suspected Acute Myocarditis

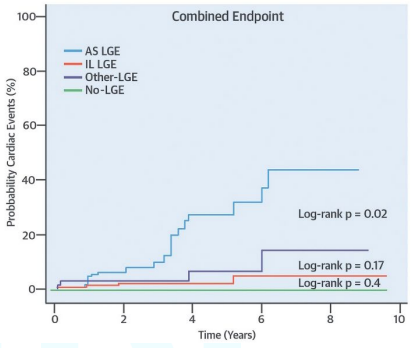


Not all troponin increase are due to ischemia. CMR helps differentiating between ischemic disease and myocarditis.

Biesbroek PS, et al. Eur Heart J Cardiovasc Imaging. 2018;19:1397–1407.

Prognostic Role of Different LGE Patterns in Patients with Acute Myocarditis and Preserved LVEF.





In patients with acute myocarditis and preserved LVEF, the anteroseptal pattern of late gadolinium enhancement was associated with a worse prognosis than the other patterns

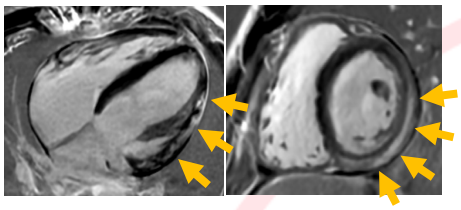
Aquaro GD, et al. J Am Coll Cardiol. 2017;70:1977-1987.

Elevated Troponin with No Obstructive CAD

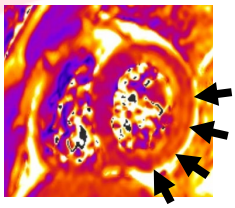
5 Images

Viral Myocarditis

Late Gadolinium Enhancement (LGE)



T2 Mapping



Epicardial LGE and correlated long T2 relaxation time.

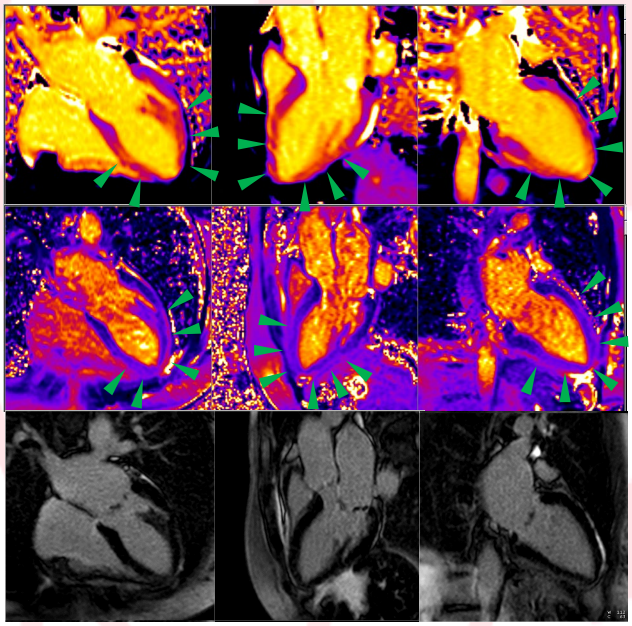
Images provided courtesy of: *Vidya Nadig;* *Hartford Hospital, CT, USA*

Takotsubo Cardiomyopathy

Native T1 mapping

T2 mapping

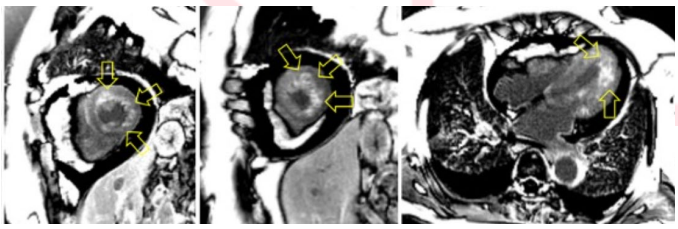
LGE



Long T1 and T2 Relaxation Time in all the mid to apical segments without LGE. ***Images provided courtesy of:*** *Kana Fujikura*
National Heart, Lung, and Blood Institute, NIH, MD, USA

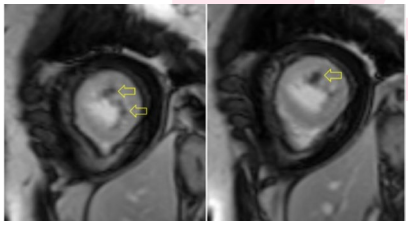
Eosinophilic Myocarditis

Flow Independent Dark Blood Delayed Enhancement (FIDDLE)

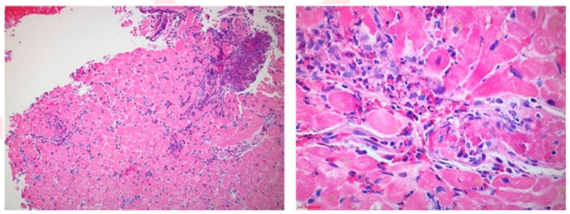


Patchy endocardial hyperenhancement along the endocardium.

Delayed Enhancement with Long T1



Dark regions were present along the endocardium, suggesting presence of multiple LV thrombi.



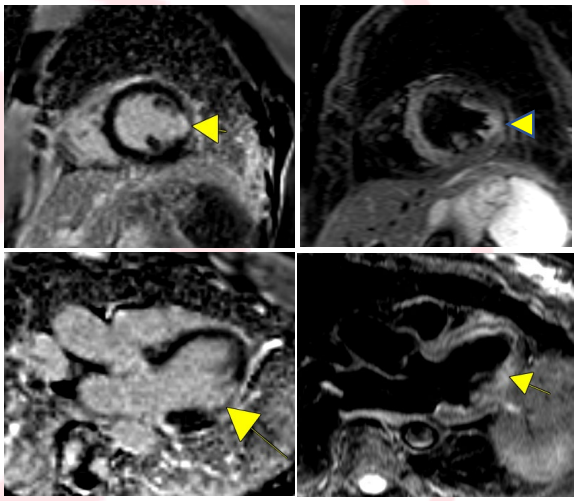
Biopsy sample confirmed moderate perivascular and interstitial inflammatory cell infiltrate with prominent eosinophils.

High dose steroid therapy was initiated with an extended prednisone taper. At one-month follow-up, symptoms resolved, and laboratory, ECG, and echocardiography findings normalized.

Myocardial Infarction with Nonobstructive Coronary Arteries (MINOCA)

73F presented with chest pain. Troponin I was 13.3 ng/L (normal < 0.04 ng/mL). Coronary angiogram showed only mild luminal irregularities without stenosis.

LGE **T2-weighted imaging**



LGE showed small area of myocardial infarction (MI) in the mid-to apical lateral segment. T2-weighted imaging showed edema correlated with LGE, indicating acute/subacute MI.

The lateral wall NSTEMI is most likely due to coronary spasm given minimal atherosclerosis, calcium channel blocker was added.

Case provided courtesy of: *Harmony Reynolds*
NYU Grossman School of Medicine, NY, USA

Cases of SCMR #21-01 Daniel B. Loriaux, Elizabeth Jenista, Han W. Kim
Duke University Medical Center, NC, USA