

# Myocardial Infarction and Nonobstructive Coronary Artery Disease, how can Stress Cardiac MRI guide the Management, A multi-modality Case Report

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We present a 52-year woman with a background of previous suspicion of spontaneous coronary artery dissection in 2010 and a previous myocardial infarction in 2012.

Multi-modality and investigations in 2010 and 2012 revealed non obstructive coronary arteries. Among the investigations at that time was a stress cardiac MRI, it revealed a small area of fibrosis in the anterolateral wall without inducible ischemia (Figure 1). MRI 2012; SAX late gadolinium enhancement revealed a small area of fibrosis in the anterolateral wall (Figure 1, red arrow), stress images (Figure 1, lower row) showed dark rim artifact and no inducible ischemic defects. Currently her symptoms recurred requiring GTN intake. The patient was transferred to our centre (2020) after a recent non-ST-elevation myocardial infarction (NSTEMI) with a significant troponin rise to 326. Her ECG (Figure 2) has shown right bundle branch block, while her echocardiogram was normal, it did not show wall motion abnormalities initially. CT Coronary Angiography was requested, it returned within normal results with non-obstructive coronary artery disease or dissections (Figure 3). As a part of investigating MINOCA, and due to previous history of MI as well as the current presentation >> a stress cMRI was requested and performed. It demonstrated good biventricular systolic function and no regional wall motion abnormalities. The posterior wall tended to show high signals of myocardial edema on mapping sequences (Figure 4, lower row right panel), the T2-STIR and prolonged T1-mapping too (Figure 4, lower row left panel). The patient experienced chest pain during the infusion of (140 µg/kg per minute) adenosine. An abnormal

inducible perfusion defect was seen in the posterior wall during the perfusion images under stress (Figure 4, red arrow). The defect was much larger than the corresponding area of LGE. Gadolinium study at mid-ventricular level has shown subendocardial late gadolinium enhancement (LGE) involving 25% of the inferolateral wall with small transmurally focus (Figure 4, blue arrow). MRI had successfully narrowed down the DD; An acute event due to the presence of Myocardial Edema Ischemic cause of the chest pain due to the positive stress study as well as the pattern of the LGE. In the presence of normal CTCA and a positive stress study either the cause is a coronary spasm or a microvascular dysfunction. Those findings were matched and confirmed by the clinical and ECG findings. An invasive angiography (Figure 5) was performed due to the MRI results, it showed normal left coronary system and no evidence of microvascular dysfunction, a small caliber RCA (Figure 5, lower right panel). The diameter of the RCA has increased significantly after infusion of nitrates indicating coronary spasm (Figure 5, lower left panel). The patient was discharged for a follow up in 3 month. The patient was prescribed isosorbide mononitrate + Diltiazem and no anti-platelet. Coronary angiography showing normal left system (upper panel). RCA small caliber (right lower panel), the diameter of RCA increased significantly after infusion of nitrates (left lower panel). Induced perfusion defects on stress cMRI is common among women with MINOCA. In this context, cMRI is an important diagnostic tool guiding management.

## References:

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- 2- MRI in Patients with Troponin-Positive Chest Pain and Unobstructed Coronary Arteries. *Curr Cardiovasc Imaging Rep* (2015) 8: 28.
- 3- Rina Mauricio, Monvadi B Srichai, Leon Axel, Judith S Hochman, Harmony R Reynolds. Stress Cardiac MRI in Women With Myocardial Infarction and Nonobstructive Coronary Artery Disease. *Clin Cardiol.* 2016 Oct;39(10):596-602.

Figure 1 MRI-2012

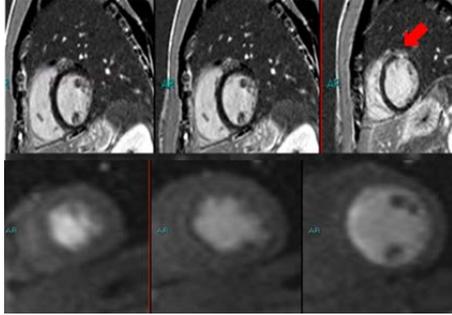


Figure 2 ECG-2020

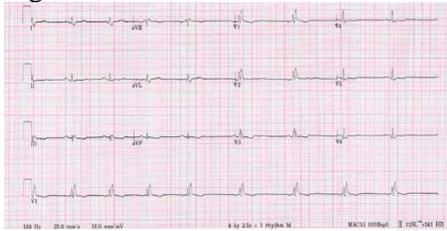


Figure 3 CT-2020

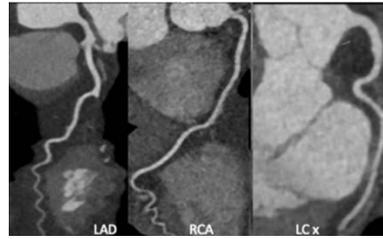


Figure 4 MRI-2020

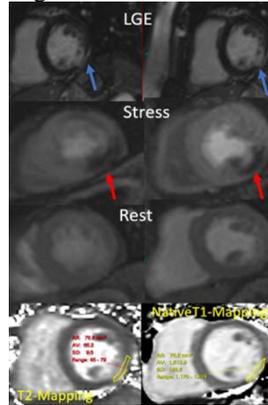


Figure 4 Invasive coronary angiography 2020

