J Cardiovasc Imaging. 2022 Jul;30(3):229-230
https://doi.org/10.4250/jcvi.2021.0198
pISSN 2586-7210·eISSN 2586-7296

Journal of Cardiovascular Imaging JCVI

Images in Cardiovascular Disease

Check for updates

Isolated Microvascular Obstruction of the Papillary Muscles: An Unveiling by Cardiac MRI

Pedro Ribeiro Queirós, MD*, Mariana Ribeiro Silva, MD*, Gualter Santos Silva, MD, Mariana Brandão, MD, and Nuno Dias-Ferreira, MD

Cardiology Department, Centro Hospitalar de Vila Nova de Gaia/Espinho, EPE, Vila Nova de Gaia, Portugal

OPEN ACCESS

Received: Dec 16, 2021
Revised: Jan 10, 2022
Accepted: Feb 3, 2022
Published online: Mar 2, 2022

Address for Correspondence:
Pedro Ribeiro Queirós, MD
Cardiology Department, Centro Hospitalar de Vila Nova de Gaia/Espinho, EPE, R. Conceicao Fernandes S/N, 4434-502, Vila Nova de Gaia, Portugal.
Email: pedroribeiroqueiros@gmail.com

*Pedro Ribeiro Queirós and Mariana Ribeiro Silva equally contributed to this manuscript.

ORCID iDs
Pedro Ribeiro Queirós
https://orcid.org/0000-0003-1998-1294
Mariana Ribeiro Silva
https://orcid.org/0000-0001-6339-659X
Gualter Santos Silva
https://orcid.org/0000-0002-9508-6825
Mariana Brandão
https://orcid.org/0000-0001-9913-0435
Nuno Dias-Ferreira
https://orcid.org/0000-0002-7362-3597

A 64-year-old woman with a positive titre for anti-phospholipid (APL) antibody was admitted with acute heart failure and loss of strength in the left upper limb. Head computed tomography showed embolic stroke, while the electrocardiogram had Q waves in the inferior leads and transthoracic echocardiogram showed hypokinesia of the inferior and posterior left ventricular walls with severe mitral regurgitation (MR). Coronary angiography showed no obstructive coronary artery disease (**Movie 1**). A cardiac magnetic resonance imaging was performed, showing diffuse hyperintensity in the short-tau inversion recovery sequence (**Figure 1A**) and increased native T1 and T2 times (**Figure 1B and C**). A subendocardial fixed perfusion defect and late gadolinium enhancement (LGE) were observed in the inferoseptal, inferior and posterior walls (**Figure 1D and F**, arrowheads). The papillary muscles presented hypoenhancement in the perfusion, early and LGE sequences (**Figure 1D-F**, arrows), and also in the cine steady-state free procession sequences, where the MR can be observed (**Movie 2**). A transoesophageal echocardiogram confirmed severe MR due to restriction of the posterior leaflet (**Movie 3**). These findings suggest a diffuse ischemic insult, with acute inferoposterior myocardial infarction with non-obstructive coronary arteries and microvascular obstruction (MVO) of the papillary muscles originating severe MR, likely related with an APL syndrome. MVO is a known poor prognosis marker in acute coronary syndromes. This is the first time that MVO is reported as affecting exclusively the papillary muscles, with a marked haemodynamic consequence.

Journal of Cardiovascular Imaging JCVI

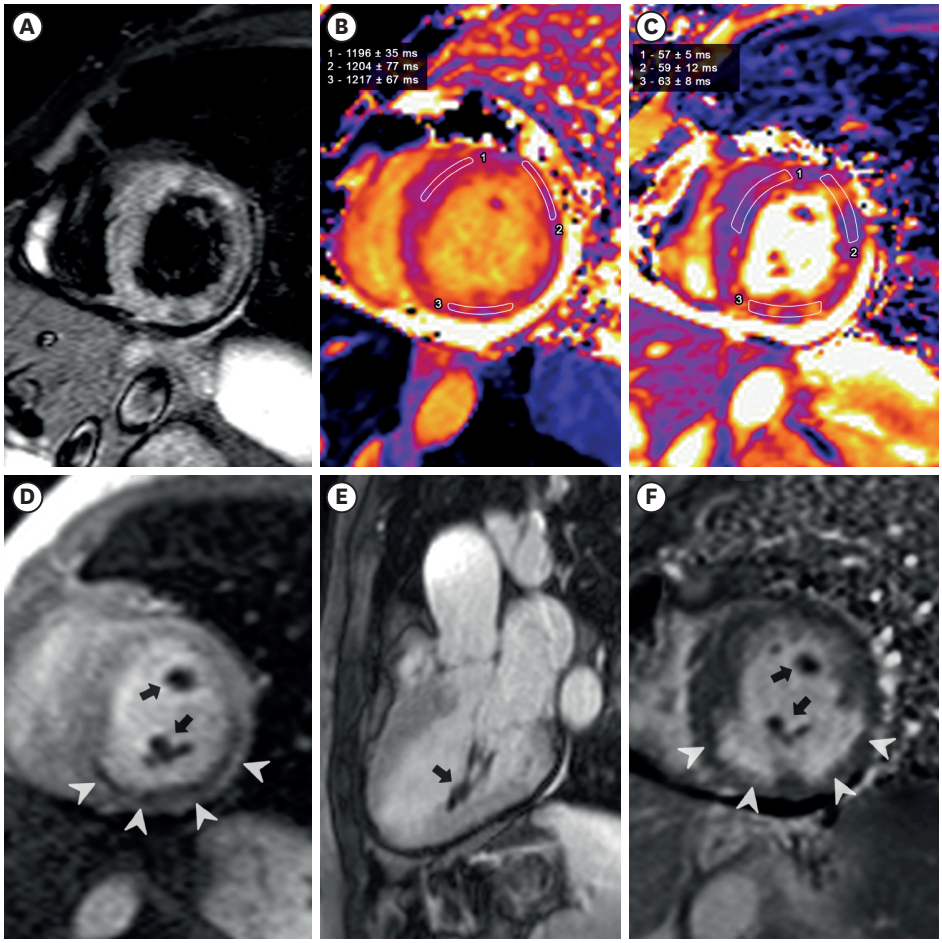

Figure 1. Short-tau inversion recovery sequence (A) showing diffuse hyperintensity in the myocardium. Native T1 and T2 times are also diffusely increased (B, C), supporting a diffuse ischemic insult. The inferoseptal, inferior and inferolateral walls show a fixed perfusion defect in magnetic resonance imaging perfusion imaging and LGE (D, F, arrowheads), suggesting a localized myocardial infarction. The perfusion imaging, early and LGE show hypoenhancement of the papillary muscles (D-F, arrows), a finding compatible with microvascular obstruction of this region.
LGE: late gadolinium enhancement.

Conflict of Interest

The authors have no financial conflicts of interest.

Author Contributions

Conceptualization: Ribeiro Queirós P; Resources: Ribeiro Queirós P, Ribeiro Silva M, Dias-Ferreira N; Software: Ribeiro Queirós P; Supervision: Santos Silva G, Dias-Ferreira N; Validation: Santos Silva G, Brandão M, Dias-Ferreira N; Visualization: Brandão M, Dias-Ferreira N; Writing - original draft: Ribeiro Queirós P, Ribeiro Silva M; Writing - review & editing: Ribeiro Queirós P, Ribeiro Silva M, Dias-Ferreira N.

SUPPLEMENTARY MATERIALS

Movie 1

Coronary angiography showing absence of obstructive coronary artery disease.

Click here to view

Movie 2

Mitral regurgitation visible on the mitral regurgitation cine sequence.

Click here to view

Movie 3

Transoesophageal echocardiogram showing severe mitral regurgitation due to posterior leaflet restriction.

Click here to view

https://doi.org/10.4250/jcvi.2021.0198