

IMAGE FOCUS

<https://doi.org/10.1093/ehjci/jeab250>

Online publish-ahead-of-print 25 November 2021

Cardiac magnetic resonance perfusion abnormality due to anaemia

Ozan M. Demir ¹, Cian M. Scannell², Amedeo Chiribiri², Sven Plein ³, and Divaka Perera ^{1*}

¹NIHR Biomedical Research Centre and British Heart Foundation Centre of Excellence, School of Cardiovascular Medicine and Sciences, King's College London, London, UK; ²School of Biomedical Engineering and Imaging Sciences, King's College London, London, UK; and ³Department of Biomedical Imaging Science, Leeds Institute of Cardiovascular and Metabolic Medicine, University of Leeds, Leeds, UK

* Corresponding author. E-mail: Divaka.Perera@kcl.ac.uk

A 72-year-old lady had investigations for angina pectoris on a background of permanent atrial fibrillation. During the course of her management, she had three adenosine stress/rest 3-tesla (3T) perfusion cardiac magnetic resonance (CMR) scans performed using dual bolus acquisition. The mean value of the 2 lowest scoring American Heart Association segments for each perfusion territory was used for quantitative analysis. At her first CMR, there was visually inducible ischaemia in the basal-to-mid inferior wall and quantitative perfusion analysis demonstrated diminished right coronary artery (RCA) MPR [Panel A; [Supplementary data online, Video S1](#)] — haemoglobin (Hb) level was 123 g/L. Invasive coronary angiography demonstrated severe right coronary artery (RCA) stenosis, mild-moderate left main stem, and proximal left anterior descending artery (LAD) stenoses [LAD fractional flow reserve (FFR) = 0.85; left circumflex artery FFR = 0.94]. She underwent RCA percutaneous coronary intervention (PCI). Post-PCI her antithrombotic regimen consisted of 3-months Aspirin 75 mg daily, 12-months Clopidogrel 75 mg daily, and Rivaroxaban 15 mg daily. At her second CMR, performed for recurrence of angina, there was global perfusion abnormality suggestive of ischaemia in all three epicardial territories [Panel B; [Supplementary data online, Video S2](#)] — haemoglobin level was 78 g/L, subsequently noticed. At her third CMR, there was no perfusion abnormality [Panel C; [Supplementary data online, Video S3](#)] — haemoglobin level was 131 g/L. The change in quantitative perfusion measurements between interval scans was remarkable (Panels A–C). This case highlights the importance of understanding pathophysiological processes that can lead to diagnostic error, elucidating anaemia as a cause of perfusion abnormality, and systematic elimination of plausible concomitant factors, especially when encountering unexpected results.

Three-tesla CMR stress myocardial blood flow maps of a patient at three different timepoints. (Panel A) First CMR performed when patients Hb is 123 g/L; (Panel B) second CMR performed for recurrence of angina, following revascularization of right coronary artery disease when her Hb is 78 g/L; (Panel C) third CMR performed when patients Hb is 131 g/L, following medical treatment of anaemia.

The authors gratefully acknowledge funding from the British Heart Foundation (PG/19/9/34228 and CH/16/2/32089), the Wellcome/EPSRC Centre for Medical Engineering (WT 203148/Z/16/Z) and the National Institute for Health Research via the Biomedical Research Centre award to Guy's and St Thomas' Hospital and King's College London.

[Supplementary data](#) are available at *European Heart Journal - Cardiovascular Imaging* online.

