associated with the incidence of atrial fibrillation? A systematic review and field synopsis of 23 factors in 32 population based cohorts of 20 million participants. *Thromb Haemost* 2017;**117**:837–850.
22. Goldberg D, Williams P. *A Users Guide to the General Health Questionnaire*. Berkshire, Windsor, UK: NFER-Nelson Publishing Co.; 1988.
23. Tunstall-Pedoe H, Kuulasmaa K, Amouyel P, Arveiler D, Rajakangas AM, Pajak A. Myocardial infarction and coronary deaths in the World Health Organization MONICA Project. Registration procedures, event rates, and case-fatality rates in 38 populations from 21 countries in four continents. *Circulation* 1994;**90**:583–612.
24. Toren K, Schioler L, Soderberg M, Giang KW, Rosengren A. The association between job strain and atrial fibrillation in Swedish men. *Occup Environ Med* 2015;**72**:177–180.
25. Fransson EI, Stadin M, Nordin M, Malm D, Knutsson A, Alfredsson L, Westerholm PJ. The association between job strain and atrial fibrillation: results from the Swedish WOLF study. *BioMed Res Int* 2015;**2015**:371905.
26. Larsson SC, Drca N, Wolk A. Alcohol consumption and risk of atrial fibrillation: a prospective study and dose-response meta-analysis. *J Am Coll Cardiol* 2014;**64**:281–289.
27. Miller JD, Aronis KN, Chrispin J, Patil KD, Marine JE, Martin SS, Blaha MJ, Blumenthal RS, Calkins H. Obesity, exercise, obstructive sleep apnea, and modifiable atherosclerotic cardiovascular disease risk factors in atrial fibrillation. *J Am Coll Cardiol* 2015;**66**:2899–2906.
28. Bettoni M, Zimmermann M. Autonomic tone variations before the onset of paroxysmal atrial fibrillation. *Circulation* 2002;**105**:2753–2759.
29. Chen PS, Chen LS, Fishbein MC, Lin SF, Nattel S. Role of the autonomic nervous system in atrial fibrillation: pathophysiology and therapy. *Circ Res* 2014;**114**:1500–1515.

CARDIOVASCULAR FLASHLIGHT

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Three Tesla cardiac magnetic resonance imaging in a patient with a leadless cardiac pacemaker system

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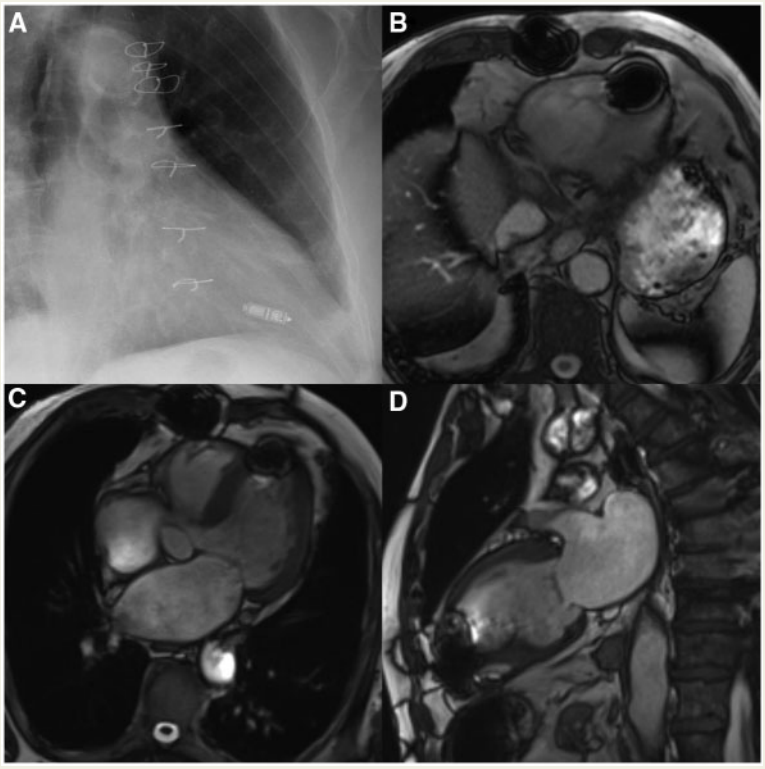
This is to the best of our knowledge the first report of cardiac magnetic resonance imaging (MRI) in a patient with a leadless cardiac pacemaker (LCP). Imaging was performed to rule out myocarditis in a 77-year-old male patient who had undergone LCP implantation (Micra™, Medtronic) for atrial fibrillation with bradycardia 20 months before (*Panel A*). After a precise check of the functional parameters, the device was programmed to the MRI mode (V00 with a fixed rate of 80 b.p.m.).

The MRI was performed in a long bore 3.0 Tesla magnet (Magnetom®Skyra, Siemens, Erlangen, Germany) with a maximal specific absorption rate of 1.5 W/kg. During MRI, the patient was monitored continuously by electrocardiogram and pulse oximetry. The cardiac MRI showed metallic artefacts at the apex of the heart due to the implanted LCP in the apex of the right ventricle and at the sternum due to sternal wires after cardiac surgery. The LCP caused an 'arc-shaped' artefact (in the cine images because of local field distortion leading to de-phasing of the transverse magnetization). However, these artefacts impaired the diagnostic quality of the cardiac MR images only in a small region of the apex (*Panels B, C,* and *D*).



During and after the scan, no device related adverse events occurred. The LCP's functional parameters were stable (pacing threshold 0.5 V and 0.38 V, impedance 550 Ω and 580 Ω, sensing 20 mV and 20 mV before and immediately after the scan, respectively).

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Supplementary material is available at *European Heart Journal* online.