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IMAGES IN CV APPLICATION

Extended cardiac magnetic resonance imaging with retained temporary transmyocardial pacing lead

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Temporary transmyocardial pacing leads, which are percutaneously placed into the myocardium of the right atrium and/or right ventricle and connected to an external pacemaker, are necessary to treat cardiac arrhythmias that can occur during the postoperative course after cardiac surgery [1]. During magnetic resonance imaging (MRI), retained pacing leads may act as antennas and absorb the electrical components of the radiofrequency fields, possibly leading to heating of the lead tip and subsequent myocardial injury. Although previous studies reported that MRI of non-cardiac regions can be performed with an acceptable benefit-risk ratio by following safety precautions and limitation of radiofrequency exposure (e.g. by using a transmit/receive coils), the presence of temporary transmyocardial pacing leads is still considered a relative contraindication to MRI [1]. During cardiac MRI, retained leads are directly positioned in the center of the radiofrequency field leading to an increased risk of radiofrequency-induced thermal injuries. Therefore, only insufficient data is available regarding cardiac MRI investigations with retained temporary pacing leads [2].

We report the case of a 24-year-old male patient with the second recurrence of a left atrial sarcoma. The patient had undergone several extensive cardiac surgery procedures including mitral valve replacement, the resection of both atria and reconstruction via a bovine patch. During last surgery, a temporary transmyocardial pacing lead (Osypka TME, Osypka AG) remained directly under the skin (Fig. 1). Recent cardiac computed-tomography studies raised the suspicion of a new sarcoma recurrence. Subsequently, an extensive cardiac MRI was performed, which unfortunately confirmed this suspicion.

Cardiac MRI was performed on clinical whole body MRI scanner (Ingenia 1.5 T, Philips Healthcare). Maximum slew rate was 200 T/m/s. The maximum specific absorption rate (SAR) was limited to 2.0 W/kg. Cardiac MRI included the acquisition of ECG-gated steady state free precession cine images, T2-weighted short-tau inversion-recovery (STIR) images, T1-weighted turbo spin echo images and late gadolinium enhancement (LGE) images. Total examination time was 1 h and 21 min. MRI could be performed safely and the patient did not report any sensations of burning or discomfort. ECG after the MRI showed a normal sinus rhythm without signs of new conduction abnormalities and cardiac troponin levels were within normal range. This report provides further evidence that extensive cardiac MRI can be performed safely even in patients with retained temporary transmyocardial pacing leads.

References

1. Homsi R, Mellert F, Luechinger R, Thomas D, Doerner J, Luetkens J, Schild HH, Naehle CP (2017) Safety and feasibility of magnetic resonance imaging of the brain at 1.5 T in patients with temporary transmyocardial pacing leads. Thorac Cardiovasc Surg. https://doi.org/10.1055/s-0037-1607331
2. Kanal E (1998) Safety of MR imaging in patients with retained epicardial pacer wires. AJR Am J Roentgenol 170:213–214

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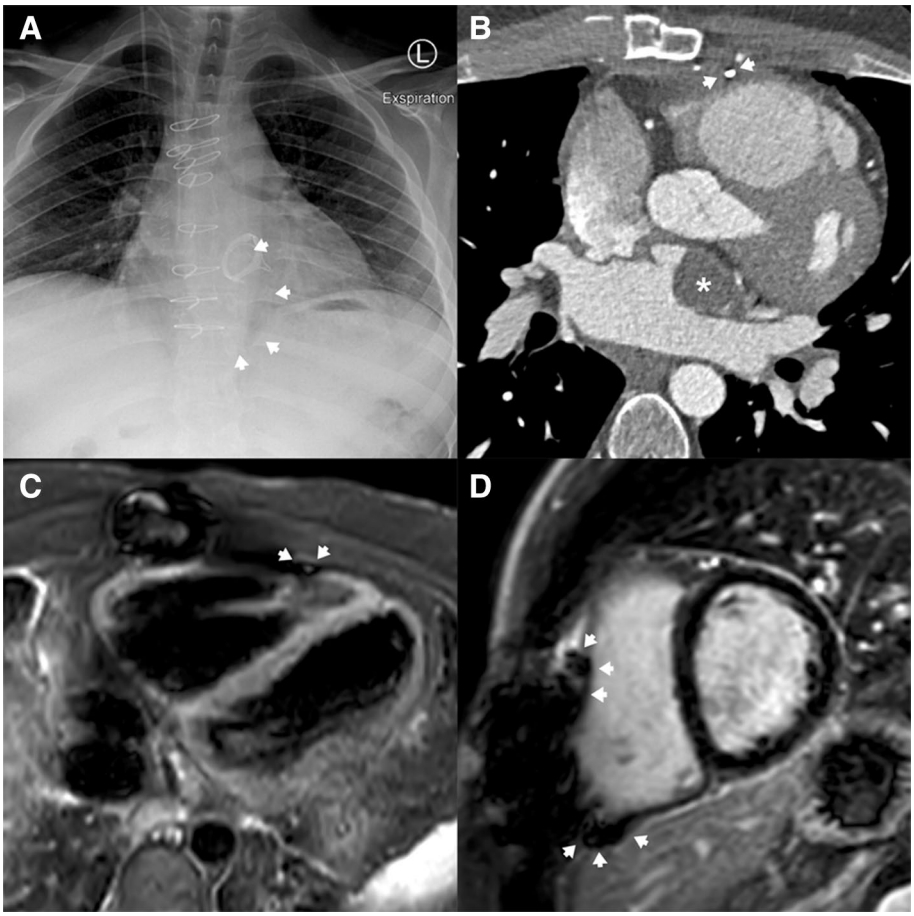

Fig. 1 Retained temporary transmyocardial pacing lead. **a–d** Conventional chest X-ray in expiration (**a**) showed retained temporary transmyocardial pacing lead adjacent to the sternum (white arrows). Contrast-enhanced, ECG-gated cardiac computed tomography (**b**) raised suspicion of sarcoma recurrence (*) and confirmed the presence of a retained temporary transmyocardial pacing lead in the wall of the right ventricle (white arrows). Transversal T2-weighted short-tau inversion-recovery (STIR) images (**c**) showed no significant artifact due to the pacing lead (white arrows). On late gadolinium enhancement (LGE) images in short-axis orientation (**d**) more pronounced artifacts are seen in the anterior and posterior wall of the right ventricle (white arrows)