Usefulness and Safety of Emergent Magnetic Resonance Imaging in Patients with Cardiac Implantable Electronic Devices

Kosuke Asahara  
Hiroshi Tasaka  
Mitsuru Yoshino  
Masatomo Ozaki  
Reo Hata  
Atsushi Sakata

Introduction: The use of magnetic resonance imaging (MRI) in patients with MRI-conditional cardiac implantable electronic devices (MRI-CIEDs) has been rapidly increasing in many fields. In clinical practice, the usefulness and safety of emergent MRI in patients with MRI-CIEDs is still unknown.

Methods: Between November 2012 and April 2019, 329 patients with MRI-CIEDs underwent MRI. Of them, we retrospectively analyzed 44 patients who had undergone emergent MRI (mean age, 81 ± 8 years; men, 73%), including one patient with an implantable cardioverter defibrillator and one patient with a cardiac resynchronization therapy defibrillator. Pacing parameters including lead impedance, signal amplitude, and pacing threshold of atrial and ventricular leads measured before and after MRI were compared.

Result: Patient characteristics, MRI region, MRI time, indication for pacemaker placement and type of device are shown in Table 1. Brain MRI for suspected acute stroke was performed on 29 patients, 18 (62%) of whom received a definite diagnosis. Between before and after MRI, no significant differences were observed in ventricular lead impedance (480 ± 90 vs. 478 ± 87 Ω, p=0.42), signal amplitude (atrial lead: 2.9 ± 1.8 vs. 2.7 ± 1.5 mV, p=0.91; ventricular lead: 10.1 ± 4.0 vs. 9.8 ± 4.7 mV, p=0.33) and pacing threshold (atrial lead: 0.5 ± 0.2 vs. 0.6 ± 0.2 mV, p=0.21; ventricular lead: 0.9 ± 0.3 vs. 0.9 ± 0.2 mV, p=0.57). Only atrial lead impedance significantly decreased between before and after MRI (517 ± 89 vs. 499 ± 86 Ω, p<0.01). No adverse events occurred during MRI.

Conclusion: This study’s relatively high diagnostic rate of acute stroke, with no adverse events,