

Case report

Pacemaker system replacement under local anesthesia allowing MRI access 7 years after the initial surgery: Two case reports

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Abstract

Background: Older pacemaker systems, which are magnetic resonance imaging (MRI) incompatible, require replacement with compatible systems when patients are in need of MRI. Replacement involves extraction of the pacing lead, which is usually done with a laser sheath under general anesthesia.

Case presentation: We report two cases of complete pacing system replacements allowing patient access to MRI. Both replacements were made under local anesthesia and without the use of special devices over 6 years after the initial surgery. Both replacements used retractable screw-in leads with a cut-down of cephalic or external jugular veins performed during the initial surgeries. Case 1 involved a 79-year-old man with cerebral ischemia, and case 2 involved a 70-year-old man with spinal canal stenosis.

Conclusion: With careful management, it is possible to replace an entire pacing system under local anesthesia without additional devices.

Key words: pacemaker, lead extraction, local anesthesia

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Introduction

Successful replacement of an older pacing system with a newer one that allows MRI access requires extraction of the older pacing lead¹. Lead extraction is usually accomplished

with a laser sheath, and the procedure requires general anesthesia and backup by a cardiothoracic surgeon^{2,3}. Herein, we describe a technique for extracting a pacing lead under local anesthesia many years after initial anchoring.

Case 1

A 79-year-old man had pacemaker surgery (generator; SJM Identity ADx XL DR, leads; SJM Tendril 1688, 53 and 46 cm screw-in type) for a complete atrioventricular block in February 2007. He had been well until he was admitted for acute myocardial infarction in October 2013. After successful percutaneous coronary intervention, he complained of dizziness and needed an MRI examination to evaluate cerebrovascular disease. After establishing temporary pacing, we removed the old generator and dissected the leads that had formed adhesions in the pocket wall. We inserted stylets into both of the old leads and twisted them counter-clockwise. After a couple of rotations, both leads were floating in the atrium and ventricle and were easily pulled out from the vessel with the stylet. We implanted a new system (generator; SJM ACCESS MRI, leads; MRI LPA1200, 46 cm screw-in type for atrium and ventricle) from the contralateral (right) side using our previously described technique⁴. The procedure was performed under local anesthesia and took 135 minutes to complete. Chest X-ray results confirmed complete removal of the old leads and satisfactory positioning of the new leads (Figure 1). A week after the surgery, magnetic resonance angiography of the brain showed stenosis of the intracranial carotid artery. The patient recovered after percutaneous transluminal angioplasty and is doing well.

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Figure 1 Chest plain radiograph before (right panel) and after (left panel) replacement of the pacemaker system. The cephalic vein and external jugular vein (white arrow) were used, respectively, for access to the ventricular and atrial leads using a cut-down technique.



Figure 2 Chest plain radiograph before (right panel) and after (left panel) pacemaker system replacement. Only a ventricular lead was inserted through the right cephalic vein because of the VVI pacing mode.

Case 2

A 70-year-old man who had pacemaker surgery for sick sinus syndrome in December 2007 (generator; Medtronic EnRhythm, leads; Medtronic CapSure 5076 52 and 45 cm screw-in type) required an MRI examination for spinal

canal stenosis. He had had chronic atrial fibrillation for 2 years, and his pacemaker was working under VVI mode. We extracted his old pacemaker and inserted a new one in December 2013, using the same procedure detailed in case 1, but the new pacing system had a single chamber (generator; SJM ACCENT MRI, lead; Tendril LPA 1200M, 46

cm) for atrial fibrillation. The replacement procedure took 75 minutes to complete, and the patient went home the same day. His postoperative chest X-ray results appeared satisfactory (Figure 2), and he undergoes regular follow-up MRIs for his spinal canal stenosis.

Discussion

There are no reports describing total pacemaker system replacement for MRI access. Successful replacement of an older pacing system depends on lead extraction. The lead extraction usually requires an invasive procedure^{2,3)} and a few studies report successful surgery under local anesthesia^{5,6)}. With patients under local anesthesia, we detached the lead tip from the heart tissue and pulled the entire lead out of the vein. Since the leads were the screw-in type, it was necessary to insert a stylet into them so that the screw tip could be twisted for retraction into the lead body. We needed to insert the stylet at least beyond the costoclavicular space to permit the necessary twisting torque. In the past, when we operated on 6 patients for lead fractures, we tried to insert the stylet into the fractured leads, but only one was successful. On the other hand, we were able to insert the stylet into all non-fractured leads (11 leads) that were beyond the costoclavicular space. Once we succeeded in inserting the stylet long enough into the leads, we could, without exception, twist the screw and retract the tip into the body. Pulling the lead out is easy after the lead tip drops out of the myocardium. Indeed, we reported earlier on a case describing the entire removal of infected leads under local anesthesia⁵⁾. We found no adhesion of the lead body to the subclavian vein or superior vena cava. Without exception, we perform a cut-down of the cephalic or external jugular vein to prevent pneumothorax or hemothorax, as previously described⁴⁾. When both the cephalic and external jugular vein were involved as shown in Figure 1, a small caliber sheath (7 Fr) was adequate for the initial surgery. Having adequate space around the lead probably contributes to prevention of lead fracture and also lead adhesion to the vein wall. We hesitate to use an excessively long lead because a redundant lead sometimes causes adhesion to the inferior/superior vena cava⁷⁾.

Indications for replacement of a pacemaker system only for MRI access are rare. As of now, we limit those indica-

tions to the following: 1) we did the initial operation by ourselves, 2) the generator battery will run low within 3 years, and 3) MRI access is required. We would abandon lead extraction when we could not detach the lead tip.

In conclusion, we have shown that extraction of a pacing lead under local anesthesia is possible and can be performed safely. Replacement of a pacing system under local anesthesia may have broad implications. Initially, operators should consider attempting pacemaker system extraction without the use of special devices.

Conflict of Interests: The authors declare that they have no competing interests.

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