Successful percutaneous extraction of a remnant floating pacemaker lead

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DESCRIPTION

A 72-year-old man had undergone dual-chamber pacemaker implantation for complete atrioventricular block 11 years previously, following which he actively swam and played table tennis; however, 3 years ago, he experienced shortness of breath while playing table tennis. Atrial lead impedance and threshold were found to have increased, resulting in pacing with a ventricular demand pacemaker (VVI) mode (lower rate, 50). An additional atrial lead was implanted owing to complete lead fracture. After 3 months, a chest X-ray revealed a completely disconnected and fractured lead. Despite the lead fracture, the patient continued to swim and play table tennis. Another 3 years later, dysfunction of the additional atrial lead was suspected at a routine pacemaker evaluation. Further, the distal part of the previous disconnected lead was found floating and moving dynamically in the right atrium and ventricle (figure 1, and videos 1 and 2). Although the patient was asymptomatic, electrocardiography revealed frequent non-sustained ventricular tachycardia. After careful discussion with cardiovascular surgeons, we performed percutaneous extraction of the floating and additional leads. After extracting the additional atrial lead using a laser sheath, a 7 Fr ablation catheter (Ablaze Fantasia; Japan Lifeline, Tokyo, Japan) was then inserted through the right femoral vein to extract the floating lead body into the inferior vena cava. The proximal end of the lead was removed from the atrium using the hooking technique, and the distal end was locked and removed using a GooseNeck Snare. Thus, the lead was successfully extracted without complications, eliminating lethal arrhythmia (figure 2, and online supplemental file 1, video 3). Although we recommended that the patient stop his table tennis and swimming activities to reduce the

Video 1 The radiography of the remnant floating lead (left anterior oblique view).

risk of lead fracture, he continued to do so after discharge. To date, no lead incidents occurred for a year.

Lead fracture is a common complication of a cardiac implantable electronic device and is more likely to occur in physically active patients.^{1,2} It often occurs in the area just lateral to the subclavian venous entry site as a result of compression of the lead between the clavicle and the first rib.² Our patient was physically active and displayed

Figure 1 The radiography: (A) the image on the left shows the posterior–anterior view and (B) the image on the right shows the left lateral view, showing the remnant floating lead (see videos 1 and 2).

Video 2 The radiography of the remnant floating lead (right anterior oblique view).

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Figure 2 The process of lead extraction is shown in the radiographies and illustrations (see video 3).

Video 3 The process of lead extraction.

excessive movement of the upper limbs, such as while playing table tennis or swimming. He was also fortunate that the ventricular lead was not in a precarious situation. Had the ventricular lead been broken, the outcome of the situation could have been very different. The remnant lead could have migrated to the right heart or pulmonary artery after complete fracture, causing the development of some symptoms or complications. Therefore, frequent X-ray evaluation of the remnant lead is recommended.

Percutaneous lead extraction of a cardiovascular implantable electronic device is safe and effective in elderly as well as in younger populations.^{3 4} The lead retrieval from the implant vein combined with a locking stylet, telescoping sheaths or powered sheaths is the conventional method for percutaneous lead extraction procedures. However, an unconventional procedure is necessary for successful lead extraction in cases in which the lead is not accessible from the implant vein, as in the case of a cut or fractured lead. Transfemoral lead retrieval using retrieval snares is one of the alternative methods to improve success rate

Patient's perspective

Table tennis and swimming are the joy of my life, and I wanted to continue them. My lead has broken twice, which required me to refrain from sports that involve moving my arms. On the first time I had a broken lead, I was very anxious because of the sudden onset of breathlessness. However, on the second time, I followed up on the lead's condition with no symptoms, which was a great relief. Lead removal is performed in surgery with a risk of death. Surgical removal was also recommended, but I am relieved that it ended successfully.

Learning points

- ▶ If the broken lead was left, frequent X-ray evaluation of the lead could be recommended.
- ▶ Percutaneous lead extraction with the snaring technique could be available for even floating leads in the right ventricle.

and reduce complications.⁵ In our case, percutaneous extraction of a free-floating lead is challenging and requires a bail-out procedure such as a femoral approach using a GooseNeck Snare. Percutaneous non-invasive lead extraction with the snaring technique can also be used for floating right ventricular leads, leading to the avoidance of surgical risks.

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