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journal or publication title	Journal of Arrhythmia
volume	37
number	6
page range	1570-1571
year	2021-12
出版者	John Wiley and Sons Inc
関連リンク	http://doi.org/10.1002/joa3.12635 (http://doi.org/10.1002/joa3.12635)
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URL	http://hdl.handle.net/10295/00006166

doi: 10.1002/joa3.12635

Lead dislodgement after a very long-term period of cardiac implantable electronic device implantation

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Abstract

A 74-year-old man was admitted for a second replacement of a transvenous implantable cardioverter-defibrillator (ICD) generator at 15 years after implantation. Postoperatively, electrocardiographic monitoring showed atrial lead malfunction. Chest X-ray revealed that the tip of the active fixation atrial lead was dislocated. We present a case of atrial lead dislodgement after a very long-term period of an ICD implantation.

KEYWORDS

cardiac implantable electronic device, complication, implantable cardioverter-defibrillator, lead dislodgement, X-ray

1 | INTRODUCTION

Lead dislodgement of a cardiac implantable electronic device (CIED) is the most frequent complication related to device implantation, and mostly occurs within 3 months after insertion. Here, we report a case of atrial lead dislodgement 15 years after an implantable cardioverter-defibrillator (ICD) implantation.

2 | CASE REPORT

A 74-year-old man who underwent transvenous ICD implantation (Maximo DR, Medtronic) for secondary prevention of ventricular tachycardia in the setting of ischemic heart disease 15 years earlier was admitted to our hospital for a second exchange of the ICD generator. The patient had not been prescribed immunosuppressive or anti-inflammatory drugs. The ICD was programmed in AAI/DDD mode at 45 beats/min and included active fixation atrial and defibrillator leads (atrial lead: CapSureFix Novus 5076, defibrillator

lead: Sprint Fidelis 6949, Medtronic). Preoperatively, the lead parameters of both the atrial and defibrillator leads were within the normal range (atrial lead—pacing threshold: 0.4 V/0.5 ms, P wave: 4.7 mV, and impedance: 564 Ω ; defibrillator lead—pacing threshold: 0.6 V/0.5 ms, R wave: 10.7 mV, and impedance: 549 Ω). The operation was performed under local anesthesia. In the generator pocket, the atrial and defibrillator leads were almost free from fibrotic adhesions, and the ICD generator was exchanged without pocket dilation or capsulectomy. Postoperatively, the patient was symptom free. However, on postoperative day 3, the electrocardiogram (ECG) monitor indicated an atrial sensing malfunction (Figure 1), and ICD interrogation revealed a loss of capture of the atrium despite maximal output from the atrial lead and a decreased sensing threshold (P wave, 0.2–0.8 mV). Chest X-rays revealed that the tip of the atrial lead had moved away from the right atrial wall, a position which had not changed previously over the past 15 years (Figure 2). Because both the atrial and ventricular pacing burden of the patient were low and he refused surgery to reposition of the atrial lead, we reprogrammed the ICD mode to VVI mode at 40 beats/min.

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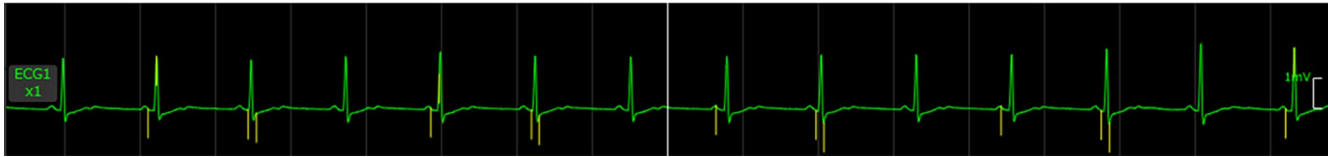


FIGURE 1 Electrocardiogram (ECG) trace on postoperative day 3, showing a normal sinus rhythm with a rate of 47 beats/min. Although the 1st, 4th, 7th, 10th, and 13th P waves are adequately sensed, the other P waves are undersensed, resulting in competition of atrial pacing with spontaneous P waves. In addition, the 2nd, 3rd, 5th, 6th, 9th, and 12th intrinsic QRS complexes are followed by ventricular spikes with an atrioventricular pacing interval of 100–110 ms, which is considered safety pacing

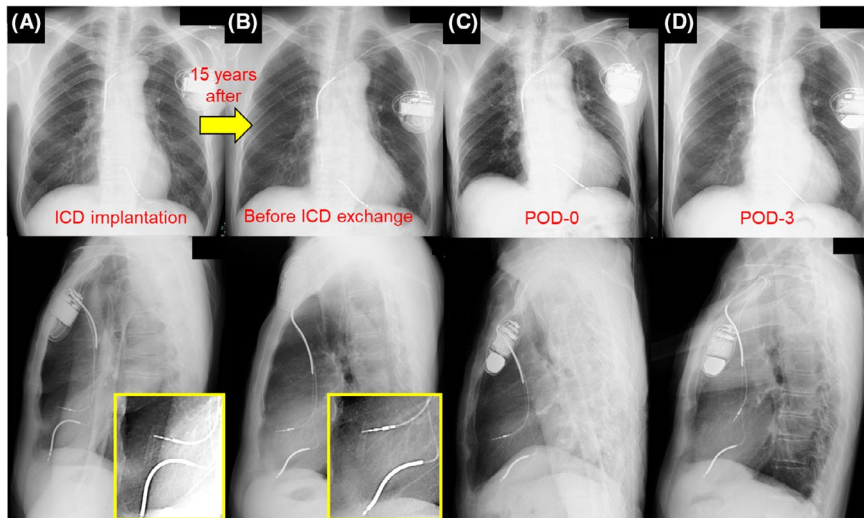


FIGURE 2 Chest X-rays from left to right: at 7 d after the original ICD implantation (A) and before (B), immediately after (C), and at 3 d after (D) ICD exchange. The upper and lower panels show frontal and lateral views, respectively. The chest X-rays immediately after ICD replacement were recorded in the supine position, while the others were recorded in the erect position. Although the chest X-ray immediately after ICD exchange shows no apparent atrial lead dislocation, the atrial lead had moved away from the right atrial wall within 3 d after the operation. Based on the positions of the tip of the atrial lead and coronary stent in the lateral images, the tip of the atrial lead had not moved over the previous 15 y. POD, postoperative day

3 | DISCUSSION

To the best of our knowledge, this case of lead dislodgement occurred after the longest reported use of a CIED. The atrial lead was dislocated from the right atrial wall and floating after ICD generator replacement. Typically, the fibroinflammatory process related to foreign body reaction results in fibrotic adhesion around the pacemaker leads over time, and consequent late dislodgement of the leads is rare. However, the severity of fibrotic adhesion varies, and a previous study reported that the degree of pocket adhesion may reflect the degree of intravascular adhesion. It is unclear why the adhesion around the leads in the generator pocket was rough in this patient, despite no immunosuppressive or anti-inflammatory drugs having been prescribed. However, loose adhesion around the intravenous portion of the atrial lead, as implied by the loose adhesion in the generator pocket, may have contributed to lead dislodgement. Moreover, postoperative chest X-ray showed that the atrial lead had been pulled upward. The mechanism remains a matter for speculation. However, it is possible that the atrial lead was pulled when it was connected to the new generator.

4 | CONCLUSION

This case demonstrates that transvenous lead dislodgement can occur long after CIED implantation and highlights the importance of postoperative ECG monitoring and chest X-ray in cases of CIED replacement.

CONFLICT OF INTEREST

The authors declare no conflict of interest for this article.

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How to cite this article: Iwakawa H, Terata K, Yamanaka T, Tashiro H, Watanabe H. Lead dislodgement after a very long-term period of cardiac implantable electronic device implantation. *J Arrhythmia*. 2021;37:1570–1571. <https://doi.org/10.1002/joa3.12635>