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Journal of Cardiology Cases

journal homepage: www.elsevier.com/locate/jccase



Case Report

Mid-axillary pacemaker re-implantation after contralateral pocket infection in an emaciated elderly case

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ARTICLE INFO

Article history:

Received 11 December 2017

Received in revised form 23 April 2018

Accepted 26 April 2018

Keywords:

Cardiac implantable electrophysiological devices

Pacemaker pocket infection

Mid-axillary pacemaker implant

Elderly

Cachexia

ABSTRACT

The number of implantations of cardiac implantable electrophysiological devices (CIEDs) has increased over the past several years. However, the aging population and expansion of indications for CIEDs have led to an increase in associated infections.

We experienced a case of a 99-year-old man presenting with skin erosion at the pocket site, where a 6-month-old implantable pacemaker was replaced. He was referred for pacemaker pocket infection and presented with fever accompanied by pain and swelling around pacemaker generator. We could not explant 7-year-old pacemaker leads and the patient refused to undergo either laser lead extraction or surgical removal. We planned to re-implant in the contralateral chest. However, the patient was emaciated with low body-mass-index (15.2 kg/m²), thus concerns arose about the possibility of tissue disruption and re-infection owing to thin skin and absence of sufficient subcutaneous tissue in contralateral subclavian region.

Axillary placement of CIEDs has been adopted in patients with limited venous access. We applied a mid-axillary pacemaker implant procedure to this elderly and emaciated patient. Postoperative clinical course was uneventful. After discharge, no history of unexplained fever or illness was recorded. Mid-axillary pacemaker pocket could be an alternative approach for re-implantation in patients with emaciated, cachexic, or limited pocket preparation.

<Learning objective: We apply the mid-axillary pacemaker implant procedure to a nonagenarian with contralateral pacemaker infection to minimize the risk of skin disruption after implantation. This implies that implantation is possible in patients with emaciated or cachexic or infection of the contralateral subclavian pocket. Mid-axillary pacemaker pocket could be an alternative approach for re-implantation in patients with emaciated, cachexic, or limited pocket preparation.>

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Introduction

The number of implantations of cardiac implantable electrophysiological devices (CIEDs), which include permanent pacemakers, has dramatically increased over the past several years [1]. However, with the expanding application of CIEDs and longer patient life expectancy, long-term device-related complications,

such as lead failure or device infection, have become important issues in clinical practice [2].

Aging of the population and expansion of the indications for CIEDs have also led to a dramatic increase in associated infections. CIED infections are associated with significant morbidity and mortality, requiring aggressive treatment. Infection following CIED replacement is a serious complication, with the rates of infection having increased [3].

Here, we report our experience with an elderly and emaciated patient who successfully underwent pacemaker re-implantation in a contralateral mid-axillary pocket after pacemaker pocket infection.

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<https://doi.org/10.1016/j.jccase.2018.04.008>

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Case report

A 99-year-old man with a 6-month-old implantable pacemaker was referred to us with fever accompanied by pain and swelling around his pacemaker generator, which was suspected as being due to pacemaker pocket infection. Erosion and discharge was observed at the pocket site, along with oozing of pus. Evaluation revealed that fistula formation and tissue disruption had already taken place (Fig. 1).

The patient had a history of complete atrio-ventricular block, for which a left-sided dual-chamber pacemaker was placed in the left anterior chest wall along with subclavian line in 2009. Six months prior to the present history, the first pacemaker had been replaced at a pocket site in the left anterior chest wall due to end of battery life of the implant. However, within six months of the re-implantation (in 2016), he presented to us with localized pain, redness, and swelling at the pocket site in the left anterior chest wall 6 days after its onset, for which he was hospitalized. His temperature was mildly elevated to 37.6 °C. Physical examination revealed redness and induration at the site of the generator pocket, with no signs of infective endocarditis. Results of blood and pocket swab cultures were negative. No vegetation was seen on echocardiography.

On the fourth day after hospitalization, his implantable pacemaker was removed, although lead explantation was unsuccessful due to severe adhesions to the vein. The generator pocket was extensively debrided. Laser lead extraction and surgical removal were not performed since they were inappropriate for this high-aged and fragile patient; besides, the patient himself refused to undergo these procedures. Hence, an externally located

temporary pacing system was implanted via the right internal jugular vein.

The patient remained hospitalized for 3 weeks for management of his infected pacemaker site. Cefazolin therapy (2 mg/day) was administered for 23 days. After 13 days of temporary pacing, the patient was scheduled for implantation of a new device in the contralateral chest wall. However, since the patient was emaciated and cachexic with a low body mass index (15.2 kg/m²), implantation in the subclavian region in the contralateral anterior chest wall was associated with the risk of tissue disruption and re-infection, owing to thin skin and absence of sufficient subcutaneous tissue.

Therefore, we decided to place a new single-chamber pacemaker in a chest wall pocket in the right mid-axillary position.

Implantation procedure

A pocket was created in the right axillary region at the level of the 6th rib via a right lateral incision in the anterior axillary line (Fig. 2A). The distal tip of the lead was pulled into position by tunneling from the subclavian incision to the pocket, and the pulse generator was positioned over the sixth rib between the mid-axillary and anterior axillary lines (Fig. 2B,C). The generator was appropriately implanted with no associated risk of skin tension (Fig. 2D). We chose the smallest pulse generator which was available in Japan at that time. Detailed procedures are available in the Supplementary material for online.

The radiographs in Panels A and B of Fig. 3 show the locations of the lead and pulse generator of the subcutaneous pacemaker.

Follow-up

The patient's postoperative course was uneventful and he continued doing well after discharge from the hospital 10 days after the procedure. Over a follow-up period of 47 days after discharge, he did not experience any episodes of unexplained fever or illness.

Discussion

We successfully performed a mid-axillary pacemaker implantation procedure on the contralateral side of a previously re-implanted pacemaker in an emaciated and cachexic nonagenarian with pacemaker pocket infection. The mid-axillary implant position is applicable in the elderly, as well as in adolescents and young females with cosmetic concerns.

We could not explant 7-year-old pacemaker leads, implanted in 2009, in this case. Ideally, the best solution to this CIED infection was to remove the entire CIED system, including old pacemaker leads. There were, however, considerable risks for this high-aged and fragile patient to perform laser lead extraction or surgical removal procedures. Severe adhesions to vein were expected in the 7-year-old pacemaker leads. And also, the patient himself refused to undergo such invasive procedures. Therefore, as an alternative strategy, we planned to re-implant in the mid-axillary position.

Some studies have identified specific risk factors associated with CIED infection. These include coexisting conditions, such as diabetes mellitus, multiple lead placement, advanced patient age, use of temporary pacing catheters, and complications at the generator incision site, including hematoma formation. Many studies also identified device revision or replacement as a risk factor for infection. Reportedly, the incidence of explantation due to infection is significantly higher after replacement procedures than after the first implantation [4].

Complete CIED removal is necessary to achieve complete cure. CIED removal, however, is not without risk, because patients who experience complicated device removal have reportedly 4-fold increased mortality than those without complications [5]. This

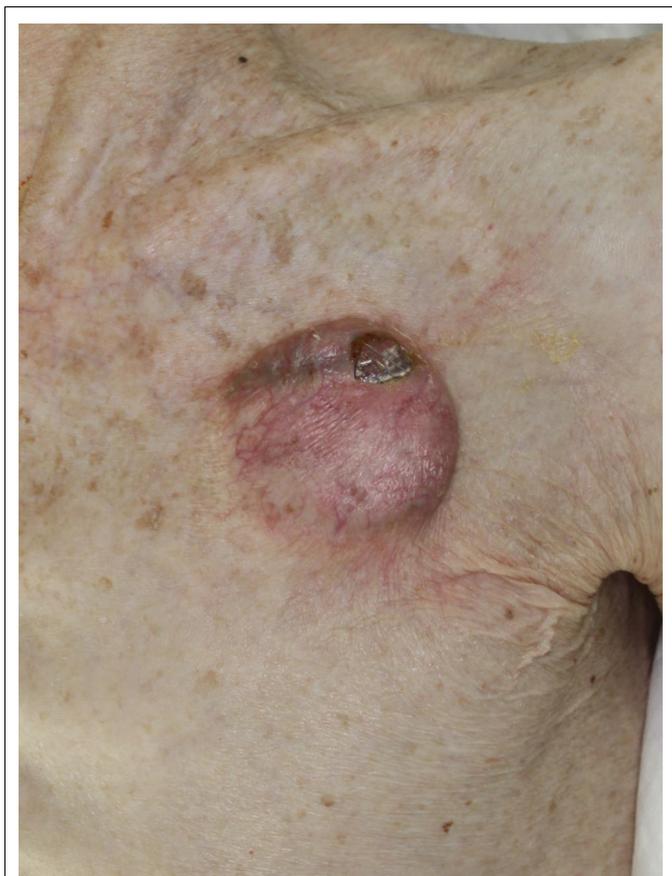


Fig. 1. Frontal view of the patient showing the infected pacemaker pocket. Skin disruption, redness, and the pulse generator are visible.

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