



## LETTER TO THE EDITOR

## Recurrent Complication of Simple and Superficial Pacemaker Pocket Infection Caused by *Staphylococcus lugdunensis*



Due to the tachycardia (paroxysmal atrial fibrillation)—bradycardia syndrome, a 65-year-old man had surgical implantation of a permanent pacemaker in September 2007. He was admitted to our emergency department with a superficial infection in the pacemaker pocket in December 2011 (Figure 1A). The pacemaker pocket located above the left pectoralis muscle displayed obvious erythematous changes but without symptoms of pustules, swelling or tenderness. It revealed that methicillin-resistant *Staphylococcus lugdunensis* was present in the culture derived from the infectious wound pocket. However, no evidence or sign of bacteremia was noticed following three sets of blood culture tests. Vegetation and thrombus formation were also not found using transthoracic and transesophageal echocardiography. To gain access to and observation of the infectious tissues in the pacemaker pocket, the debridements of the left pacemaker pocket and the generator were performed based on the 2010 American Heart Association guidelines, and considering the fact that this patient suffered only with incisional and superficial pacemaker pocket infection. However, the two pacemaker tined leads were kept at the same position without removal during the procedure of debridement.<sup>1</sup> No necrosis and pustules over the pocket tissue were observed during surgical debridement. To confirm the pathogen-free microenvironment in the pocket, the tissue samples were acquired and then cultured in growth medium. The results demonstrated that no microbial colonies were found, indicating no intruding pathogens staying or growing in the tissue surrounding the pacemaker pocket. Following surgical debridement, intravenous administration of daptomycin (500 mg/day) and meropenem (1 g every 8 hours) were prescribed continuously for 4 weeks. A new pacemaker system was then implanted at the right subclavicular region.

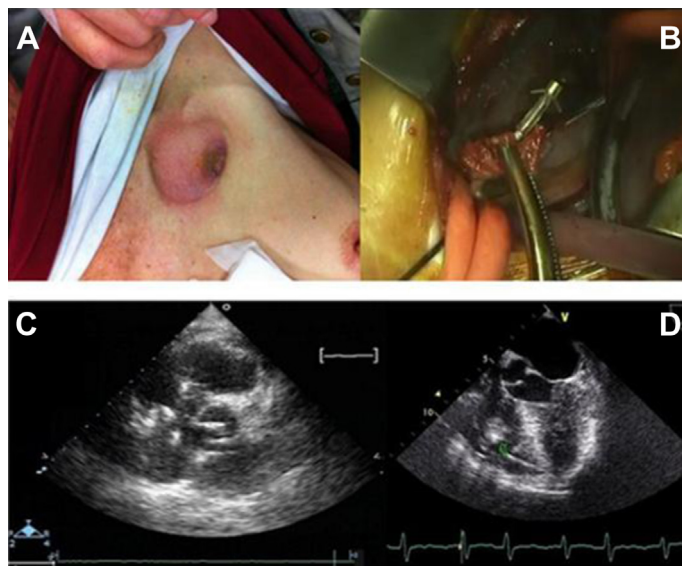
In September 2012 (9 months after replacement with the new pacemaker implantation), he was hospitalized again because of recurrent atrial fibrillation. High fever and chills were noticed 1 day after hospitalization. Cardiac auscultation indicated irregular heart rate with Grade III/VI systolic murmur over the left fourth to fifth intercostal spaces. No sign of infection was detected at the left or right pacemaker pocket region, indicating that the pacemaker pocket was infection free. However, colonies of methicillin-resistant *S. lugdunensis* (the same pathogen as the previous pocket wound infection) appeared positive in four sets of blood cultures. A hyperchoic lesion was detected on the tricuspid valve region using transthoracic echocardiography (Figure 1C). A vegetation

(1.8 cm × 1.4 cm) over the pacemaker leads (Figure 1D) was also discovered using transesophageal echocardiography. The patient then underwent minimal invasive tricuspid valvuloplasty with extraction of all pacemaker devices. One yellowish vegetation was excised along the old residual tined but none on the new screw-in pacemaker leads was found (Figure 1B). After the surgical procedure, the patient's fever subsided. Intravenous treatment with daptomycin 500 mg/day and fosfomycin 2 g every 12 hours was given for up to 4 weeks. The patient was discharged thereafter and remained asymptomatic for >1 year.

Infections in cardiovascular implantable electronic devices (CIEDs) are rare but they can turn into serious complications. As previously described, the most commonly implicated microorganisms or pathogens are *Staphylococcus aureus* and *Staphylococcus epidermidis*.<sup>2</sup> Surprisingly, *S. lugdunensis*, one of the coagulase-negative staphylococci, actually mediated CIED infection and was isolated in the present case, which is unusual and rarely reported. *S. lugdunensis* mediates rapid valvular destruction in tissues, which are common and typical symptoms of *S. lugdunensis*-induced infectious disorder. Notably, *S. lugdunensis* does not respond well to conventional antimicrobial therapeutic regimens, making it difficult to eradicate them. Therefore, we should not consider this infection as a nonpathological cutaneous commensalism.

According to the 2010 American Heart Association guidelines, the preservation of pacemaker leads could be considered in patients with only incisional and superficial pacemaker pocket infection.<sup>1</sup> In recent reviews of CIED infection, complete removal of all cardiac devices is still recommended in patients with definite CIED infection, localized CIED pocket infection, erosion of CIED, and staphylococcal bacteremia.<sup>3</sup> Retaining all or part of the cardiac device intact is associated with higher morbidity, mortality, and relapse rate. Antibiotics should be administered and the duration of treatment should be guided by the result of blood cultures, evidence of vegetation demonstrated by transesophageal echocardiography, and erosion of hardware devices.<sup>2</sup> Recently, typical techniques involved in lead removal consist of percutaneous and surgical approaches. Laser-assisted counter-traction has been reported and suggested to have better outcome in reduced extraction failure rates, in comparison to conventional percutaneous methods.<sup>4</sup> However, the role of percutaneous leads extraction with large vegetation remains controversial; surgical removal of leads is indicative of a failed percutaneous approach, suspicious infection of epicardial leads, widespread pericarditis, and deep mediastinal infection. Previous case reports suggest that conservative treatment may benefit patients with tight adherent leads, high surgical risk, and simple and superficial pacemaker pocket

Conflicts of interest: The authors declare no conflict of interest in writing this report.



**Figure 1** (A) A superficial erosive wound with erythematous change over the left pacemaker pocket is observed. (B) One yellowish vegetation is found along the old residual tined but not in the new screw-in pacemaker leads during the surgical procedure. (C) Parasternal short axis view of transthoracic echocardiography displays a hyperechoic lesion on the tricuspid valve region. (D) A vegetation (arrow) region around 1.8 cm × 1.4 cm along the pacemaker leads is measured using the mid-esophageal four-chamber view of transesophageal echocardiography.

infection.<sup>5</sup> During the first hospitalization in the present case, pacemaker leads preservation was decided and resulted from the superficial and simple pacemaker pocket infection, coupled with negative bacteremia, and no vegetation disclosed using transesophageal echocardiography. However, recurrent infections occurred about 9 months later and may have resulted from the insidious infection of the pacemaker leads, leading to the failure in our initial procedure in preserving the leads without any symptomatic signs as we thought. In addition to the present case, 11 more cases of CIED endocarditis caused by *S. lugdunensis* have been reported in Taiwan.<sup>6</sup> Thus, a high risk of *S. lugdunensis*-induced CIED endocarditis may be caused by remanipulation of the pacemaker system.

Extraction of all pacemaker leads is strongly recommended in patients even only with simple and superficial pocket infection combined with pathogenic colonies-free results in the blood culturing tests as well as absence of vegetation using the detection of trans-esophageal echocardiography.

## References

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