



Lead Erosion of Subcutaneous Implantable Cardioverter-Defibrillator: Successful Management without Device Removal

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Abstract

Without intra-cardiac involvement, the management of subcutaneous implantable cardioverter-defibrillator (S-ICD) related complication differs from those of traditional transvenous ICD. Herein, we presented one rare case with S-ICD lead erosion at the xiphoid without systemic bloodstream infection. We performed the conservative surgical debridement without complete device removal. Moreover, lead erosion at the xiphoid is one rare but serious complication. This may be caused by extreme superficial lead placement during implantation. To avoid this complication, suturing the lead with a sleeve to the submuscular layer during the implantation may be necessary to ensure adequate tissue coverage, especially in slim individuals.

Keywords: lead erosion; subcutaneous implantable cardioverter-defibrillator; infection

Introduction

Patients at high risk of sudden cardiac death benefit from ICD therapy. Due to extra-thoracic position of the S-ICD lead, the trans venous lead related complication is significantly reduced in S-ICD patents [1]. Most of S-ICD complications were associated with generator pocket, including poor healing and localized infection [2]. However, S-ICD lead erosion at the xiphoid is a serious complication that has rarely been reported. This complication may arise from implantation technique and mechanical trauma. Complete device removal is the gold standard treatment in patients with trans venous ICD lead erosion [3]. However, owing to the lower risk of blood-borne infection in patients with S-ICD, the treatment option for S-ICD lead erosion may be different from trans venous lead erosion. Herein, we demonstrated a reasonable and effective treatment strategy for S-ICD lead erosion without systemic infection.

Case Presentation

This 17-year-old male patient suffered from out-of-hospital cardiac arrest and ventricular fibrillation during the marathon, successful recovery of spontaneous circulation after CPR, and

defibrillation. He denied any family history of sudden death. Echocardiography and electrophysiological study with flecainide challenge test were unremarkable, cardiac MRI showed absence of structural abnormalities or arrhythmic scar formation. Under the impression of idiopathic ventricular fibrillation, He was indicated for implantable cardioverter-defibrillator (ICD) for secondary prevention. Finally, subcutaneous implantable cardioverter-defibrillator (S-ICD) implantation was performed with 2 incision implant technique without any complication. Two incision wounds were healed as well as appropriate S-ICD function during follow-up. About 5 months after the procedure, the patient complained of subcostal wound swelling with exudative discharge. The S-ICD lead was partially exposed at the subcostal region. At that time, we haven't documented any interrogated record regarding the sensing failure and inappropriate shock. Although the lead was partially exposed, the whole S-ICD system was not removed immediately. Furthermore, we considered the empirical antibiotics and conservative treatment because there was no systemic inflammatory response in blood examination and exudative discharge did not cultivate any organism. However, after 6 weeks of wound care, the wound was not healed well finally, we performed the surgical

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debridement of necrotic tissue and surgical reposition of the S-ICD lead into the intermuscular layer at the xiphoid region. After the debridement, chest x ray showed appropriate position of the lead without displacement the wound at the xiphoid was healed

well. The patient was discharged after full course antibiotics. Follow-up S-ICD interrogation didn't show any vector alternation or sensing abnormalities. No inappropriate shock was delivered from the S-ICD system (Figure 1).

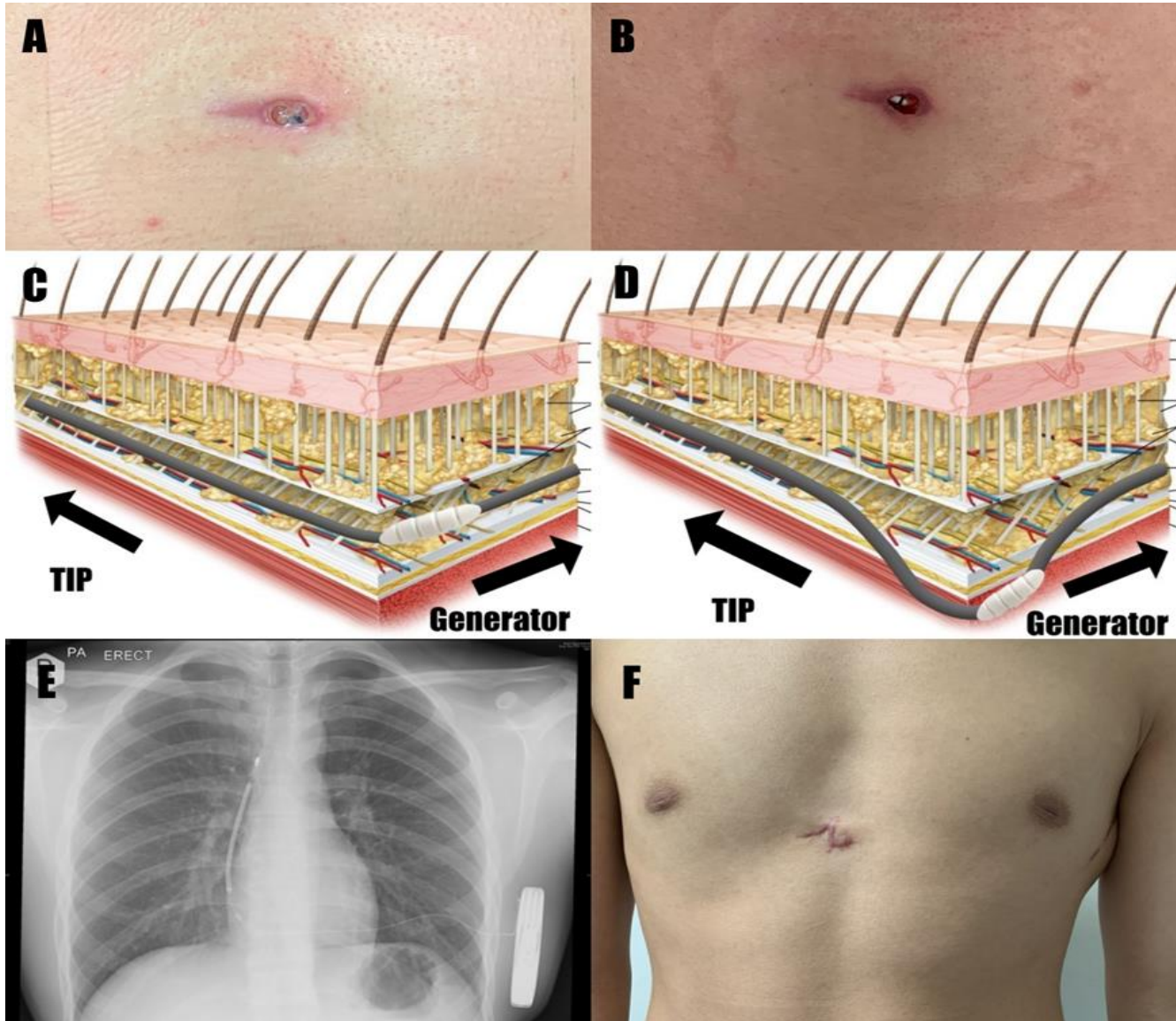


Figure 1: (A) Wound swelling with exudative discharge at xiphoid region (B) Partial erosion of S-ICD lead and poor wound dehiscence (C) S-ICD lead at fascial layer before debridement (D) After surgical debridement of necrotic tissue, reposition part of the S-ICD lead into the intermuscular layer at xiphoid region (E) Chest x ray showed appropriate position of S-ICD lead (F) the wound was healed well eventually

Discussion

S-ICD implantation is one therapeutic option for patients with ICD indication, in whom without bradycardia or ventricular tachycardia required pacing. The S-ICD system has been reported to have significantly lower lead-related complication rates compared with the trans venous ICD [4]. The recommendation of device erosion and pocket infection management for trans venous

ICD were entire system removal because of the concern of bacteremia and infective endocarditis [3]. However, based on the unnecessary of trans venous lead, the incidence of device-related bacteremia and endocarditis is significantly decreased in the S-ICD population [5]. Previous cohort studies showed that neither infective endocarditis nor blood-borne infection was observed in the S-ICD population during follow-up [1]. Partial lead erosion of S-ICD without systemic infection can be managed conservatively

without entire device removal. A similar study reported that minimal lead erosion can be managed conservatively with a course of antibiotics or surgical approach [6]. This conservative strategy may be less invasive and more reasonable than those with entire device removal. S-ICD lead erosion at the xiphoid is a rare but serious complication that may be related to the implantation process, mechanical stress and hypertrophic scar formation. In some slim patients, the subcutaneous fat tissue at the xiphoid may be too thin which may not provide adequate protection of the S-ICD lead. The superficial fat tissue at the xiphoid is damaged after mechanical trauma or scratching hypertrophic scar tissue, thus the lead may be eroded. To avoid and manage this complication, we can consider to fixate part of S-ICD lead with a sleeve to the sub muscular layer (sternal is muscle), rather than the superficial fascia layer. This case report demonstrated successful management of S-ICD lead erosion without systemic infection. Localized surgical debridement following embedding the lead into deeper muscle layer and closure with adjacent skin flap was done without alternation of vectors and sensing threshold. A similar interventional approach was also used for neurological device erosion. Reconstructive surgery with skin flap for hardware-related erosion had been successfully managed without entire device removal [7]. Our case showed a reasonable treatment option of S-ICD lead erosion without entire system removal and without alternating the function of S-ICD.

Conclusion

S-ICD lead erosion at the xiphoid can be treated conservatively without entire device removal. To avoid this complication, we may fixate the sleeve with part of S-ICD lead to the sub muscular layer during implantation, especially in some slim patients.

Ethical Approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institution or practice at which the studies were conducted.

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