

Subcutaneous ICD implant complicated by an intraperitoneal lead course and device infection



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Introduction

The subcutaneous implantable cardioverter-defibrillator (S-ICD) is a novel device that demonstrates high efficacy for treatment of ventricular tachycardia and ventricular fibrillation and is an alternative to the transvenous ICD device. The safety and efficacy of the S-ICD has been thoroughly evaluated, and pooled data from the IDE and Effortless studies show only a 0.8% incidence of suboptimal electrode placement.¹ We present a case of extreme lead misplacement that represents how a usually simple implant procedure can result in a serious complication in the hands of an inexperienced implanter.

Case

A 74-year-old man with a history of ischemic cardiomyopathy and an S-ICD placed at an outside facility presented with purulent drainage from a midepigastic incision site 3 months after implantation. Four weeks following the implant, he noted erythema over his inferior sternum and swelling at the pocket site. He was prescribed 2 separate courses of oral clindamycin. However, the erythema and swelling did not resolve, and he consequently sought care at our facility. On examination, he was afebrile with average build (BMI 27.9). He had a 0.5-cm fistulous tract with purulent drainage at an incision site below the xiphoid process and erythema and bruising over the generator pocket. He had no leukocytosis, and blood cultures returned no growth. Wound cultures grew methicillin-sensitive *Staphylococcus aureus*. A subsequent computed tomography scan demonstrated an intraperitoneal course of the S-ICD lead near the colon (Figure 1A).

KEYWORDS Subcutaneous implantable cardioverter-defibrillator; Intraperitoneal lead; device infection (Heart Rhythm Case Reports 2016;2:270–271)

Conflicts of interest: none. **Address reprint requests and correspondence:** Dr Michael R. Kaufmann, NF/SG Veterans Health System, 1601 SW Archer Rd., 111-D, Gainesville, FL 32608. E-mail address: Michael.kaufmann@va.gov.

The S-ICD and lead were surgically extracted, and purulent fluid was observed in the pocket and at both the xiphoid and superior parasternal incision sites. Intraoperative cultures returned positive for methicillin-sensitive *Staphylococcus aureus*. A wound vacuum-assisted closure therapy system (Kinetic Concepts, San Antonio, TX) was placed at the pocket site, and all wounds healed by secondary intention. The patient was treated with 4 weeks of IV oxacillin and was doing well at his 2-month follow-up visit.

The procedure report states the implanting physician used fluoroscopy at the beginning of the procedure only to identify the left ventricular apex; the pocket incision was made using this landmark. The implanter then tunneled from the pocket to the xiphoid tie-down location. Defibrillation threshold testing was successful at 65 J. There is no documentation of postprocedure chest radiography being performed at the implantation visit, and the computed tomography scan image later obtained at our institution shows that the xiphoid tie down was positioned well below the xiphoid process (Figure 1B).

According to the manufacturer, insertion of the S-ICD is guided by anatomical landmarks, and fluoroscopy is optional. The generator pocket is created between the fifth and sixth intercostal spaces at the left midaxillary line, and the xiphoid incision is made just left of and 1 cm above the xiphoid process. The lead should be positioned with the defibrillation coil parallel to and 1 to 2 cm to the left of the sternal midline, near or in contact with the deep fascia, with the distal sensing electrode secured adjacent to the manubriosternal junction and the proximal sensing electrode secured just left of and cephalad to the xiphoid process. Marking anatomic landmarks with a surgical marker prior to draping the patient can help to ensure appropriate implant position. Importantly, tunneling from the xiphoid incision to the generator pocket is recommended with steady upward pressure on the tunneling tool handle, ensuring passage along the subfascial plane.² Our institutional implant

KEY TEACHING POINTS

- The subcutaneous ICD (S-ICD) is a highly effective device with low implantation-procedure complication rates. However, it is important to recognize that a usually simple implantation procedure can result in serious complications, especially in the hands of an inexperienced implanter.
- Careful preprocedure marking of anatomic landmarks and proper tunneling technique are important to avoid improper S-ICD generator and lead positioning and associated adverse clinical events. Limited fluoroscopy may also be considered in select cases.
- If S-ICD device infection, dysfunction, or complication is suspected, computed tomography imaging may be useful to exclude improper lead course.

technique also uses blunt finger dissection to help create this tract prior to tunneling.

This case represents failure to identify appropriate anatomic landmarks, failure to tunnel in the recommended direction, and failure to tunnel in the correct plane causing an intraperitoneal ICD lead course likely resulting in a device infection. Careful preprocedure marking of anatomic landmarks regardless of body habitus, proper tunneling technique, and judicious use of limited fluoroscopy throughout the case are important tools to avoid improper S-ICD generator and lead positioning and associated adverse clinical events. If S-ICD device infection, dysfunction, or complication is suspected, then when appropriate, CT imaging is a valuable tool to exclude improper lead course.

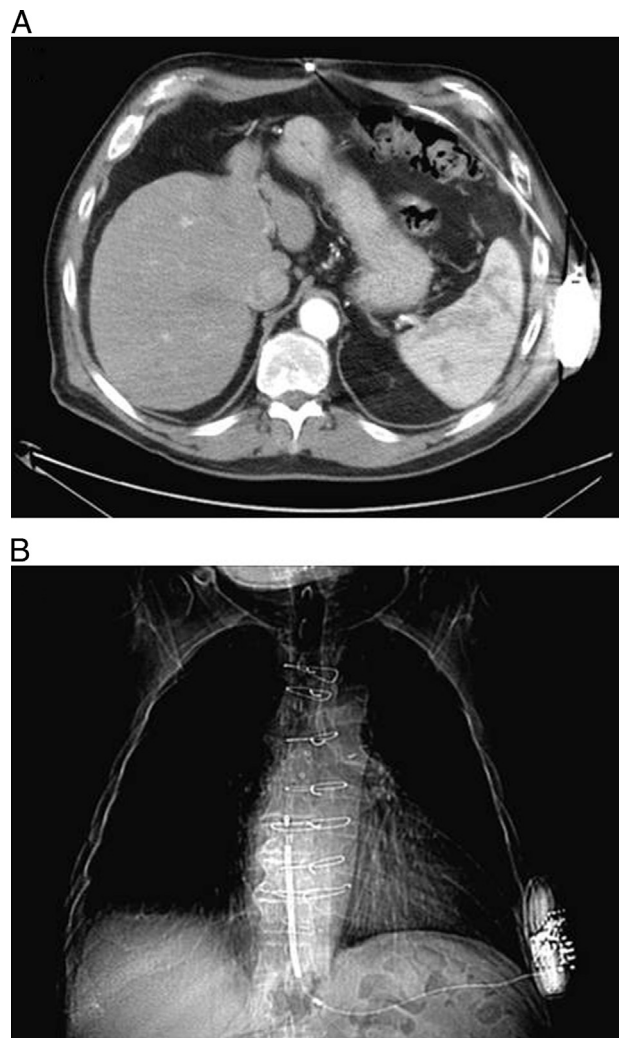


Figure 1 A: CT scan cross-sectional image showing an intra-peritoneal course of the S-ICD lead, immediately adjacent to the colon. B: CT scan scout image showing the inferior tie down of the S-ICD lead well below the xiphoid process.

References

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