

Allergic Reaction to Suture Material After an ICD Procedure: Device Infection Mimicry

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Suture Allergy Can Mimic ICD Infection. When an implanted device is infected, complete explantation of the device system, including lead extraction, is usually required. Superficial problems with wound healing may be managed more conservatively, but distinguishing between a surface process and deeper infection can pose a clinical challenge. We present a case of poor wound healing after an ICD pocket revision procedure, and an allergic reaction to the suture material was found to be the cause. Diagnosis, management, and future implications of suture allergy are discussed. (*J Cardiovasc Electrophysiol*, Vol. pp. 1-3)

allergy, suture, implantable cardioverter defibrillator (ICD), infection, lead extraction, wound care

Introduction

When a device wound fails to heal, with persistent local inflammatory changes seen at the implantation site, infection of the underlying hardware is most often the culprit.¹ Explantation of the pulse generator, complete lead extraction, and removal of all foreign material is typically necessary to definitively treat an infection that involves the device system.² Other local problems with wound healing can occur, however, and it is important to distinguish between a superficial process and one that involves the device itself to avoid unnecessary removal of device hardware or exposing a sterile pocket to bacteria from the skin surface. We present a unique case of poor wound healing after a cardiovascular implantable electronic device (CIED) procedure because of an allergic reaction to suture material. The diagnosis, unique management of this patient, and implications for future procedures are discussed.

Case Report

A 54-year-old woman with repaired tetralogy of Fallot and a history of multiple medication allergies had a dual chamber implantable cardioverter defibrillator (ICD) implanted in 2003 for ventricular tachycardia (VT). She underwent a generator change in 2005 for a device advisory, an ICD lead extraction and reimplantation in 2006 for a lead fracture and inappropriate shocks, another ICD lead extraction and reimplantation in 2008 for an ICD lead advisory, and a pocket

revision also in 2008 for slight migration of the ICD generator with subjective discomfort. In each case, the device wound was closed in 3 layers with Polysorb absorbable suture. After the first 2008 procedure, the wound was slow to heal, but complete healing was noted after 4 weeks. After the second procedure in 2008, however, the wound failed to heal over several weeks, with persistent clear drainage, skin ulcerations, and visible suture strands (Fig. 1A). Given the multiple device procedures and lack of wound healing, a device infection was presumed and the patient was scheduled for a full device and lead extraction.

The patient was brought to the electrophysiology laboratory, placed under general anesthesia, and femoral venous and arterial access was obtained, as per our lead extraction protocol. After sterile preparation of the pectoral site, an elliptical skin incision was made around the wound to excise the devitalized skin. Soft, liquefied tissue was found along the length of the wound wherever suture strands remained, including underneath superficial bridges of healed skin, with copious serous drainage noted. Below the dermis, a healthy base of granulation tissue was found, without purulence and without any obvious exposure to or communication with the underlying device and lead hardware. Because of the unusual appearance of the tissue that was in contact with suture material, and the lack of any visual extension of the ulcerating process to the deeper tissues or device pocket, a reaction to the suture material was hypothesized. The device pocket was not opened, all suture material was removed from the surgical site, the excised tissue fragments were sent for culture and pathologic evaluation, and the wound was left to heal by secondary intention. To accelerate wound healing, a vacuum dressing system was used (Fig. 2A). Negative pressure wound therapy involves the fitting of a foam dressing that is cut to match the wound dimensions, application of an occlusive, adhesive sheet over the foam dressing, and the incorporation and attachment of tubing and a negative pressure pump system that delivers continuous subatmospheric pressure to the wound environment. The vacuum dressing system promotes wound healing by secondary intention by reducing edema, promoting perfusion and granulation tissue formation, and removing exudates and infectious material.

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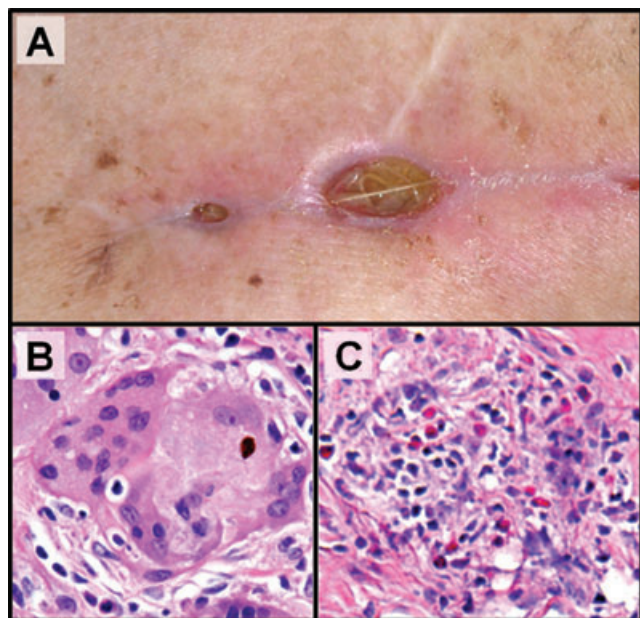


Figure 1. A: Photograph of the nonhealing device wound, 4 weeks after a prior pocket revision procedure. Suture strands and serous fluid are seen within ulcerations along the wound. B: Microscopy example of a multinucleated giant cell from the tissue specimen that was sent for pathologic evaluation. C: Microscopy example of inflammation with many eosinophils (orange-red staining) from the same specimen.

To investigate the possibility of an allergic response to suture material, a dermatology consult was requested, and skin testing was recommended. After informed consent was obtained for skin testing, the right upper inner arm was anesthetized with 1% lidocaine local injection, and a variety of suture materials were placed to look for an allergic response (Fig. 3A). After 2 weeks, only the 2 Polysorb sutures demonstrated an erythematous reaction, but not the other suture materials tested (Fig. 3B). Pathologic analysis of the ICD wound excised tissue revealed both giant cells (Fig. 1B) and numerous eosinophils (Fig. 1C), consistent with an allergic response. After several weeks of careful wound care, including serial removal and refitting of the foam material that is used in the vacuum dressing system (Fig. 2B), fol-

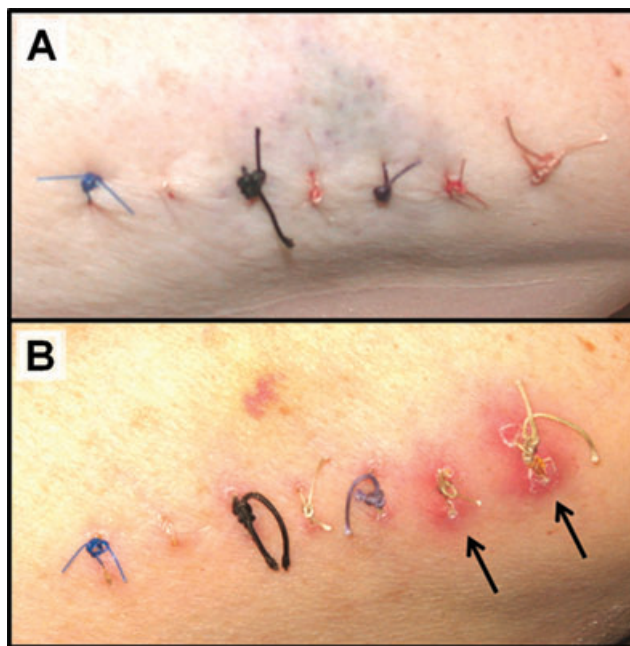


Figure 3. A: Photograph of 7 sutures in the right upper inner arm, placed for allergic skin testing. From left to right, the sutures are 3-0 Prolene, 5-0 Polydioxanone (PDS), 0 Sof silk, 4-0 Vicryl, 2-0 Vicryl, 4-0 Polysorb, and 2-0 Polysorb. B: Photograph of the 7 skin-testing sutures at 2 weeks, demonstrating an erythematous reaction only to the 2 Polysorb sutures (arrows).

lowed by simple gauze dressings, the wound fully healed (Fig. 2C).

Discussion

After CIED implantation, superficial wound infections and allergic reactions can lead to poor skin healing, which can easily be mistaken for a pocket or device infection. The appropriate management, however, may simply be to treat the superficial process and not explant the device system. Local allergic reactions may occur to the dressing adhesive or, to topical antimicrobial ointments. In this case, an allergic reaction to Polysorb suture material is evidenced by the macroscopic observations at the time of wound exploration, pathologic analysis of excised wound tissue, an allergic response to Polysorb suture during skin testing, and full wound healing once the antigenic suture material was removed. Contributing factors likely included the patient's allergic tendency, with known allergies to multiple medications, and repeated exposure to the same suture antigen, with 2 device procedures being performed several weeks apart, both using Polysorb suture for wound closure.

In the dermatology literature, allergy to the colored dye in suture has been reported, and to specific suture types,³⁻⁶ but this phenomenon has not been described before in the setting of CIED implantation, which has unique implications because of the presence of permanent device hardware. Skin testing can determine which types of suture may be used safely, which is of critical importance for future surgical procedures where suture is needed for wound closure. An allergy to Polysorb suture was documented in this patient's medical record, and alternative absorbable suture material

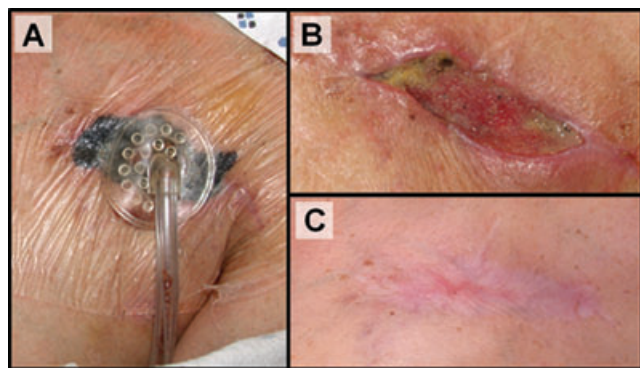


Figure 2. A: Photograph of the vacuum dressing system, showing the black foam cutout in the wound, and the overlying surface adhesive and vacuum tubing. B: Photograph taken at the time of a dressing change, showing healthy granulation tissue in the wound, and a few small black foam particles from the dressing. C: Photograph of the fully-healed wound.

will be used in the future, at the time of her next device procedure.

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