

Successful transvenous lead extraction after a failed open surgical attempt

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An 81-year-old man with a chronically infected cardiac resynchronization therapy defibrillator was referred after previous failed extraction attempts transvenously and by open cardiac surgery. We extracted the system without complication using a combination of Cook Evolution mechanical sheaths, a Byrd Workstation retrieval set, and a Needle's Eye Snare.

An 81-year-old man was referred with an infected cardiac resynchronization therapy defibrillator (CRT-D) system. His initial dual-chamber implantable cardioverter-defibrillator (ICD) had been implanted 8 years earlier and upgraded to a CRT-D system 2 years before referral. Epicardial atrial and left ventricular (LV) leads were subsequently added after the endocardial LV lead lost capture. The endocardial LV lead was abandoned.

One year before referral, a local revision was performed for impending erosion. Erosion recurred and methicillin-resistant staphylococcus aureus (MRSA) was grown. An attempted transvenous extraction 9 months before referral was aborted due to inability to

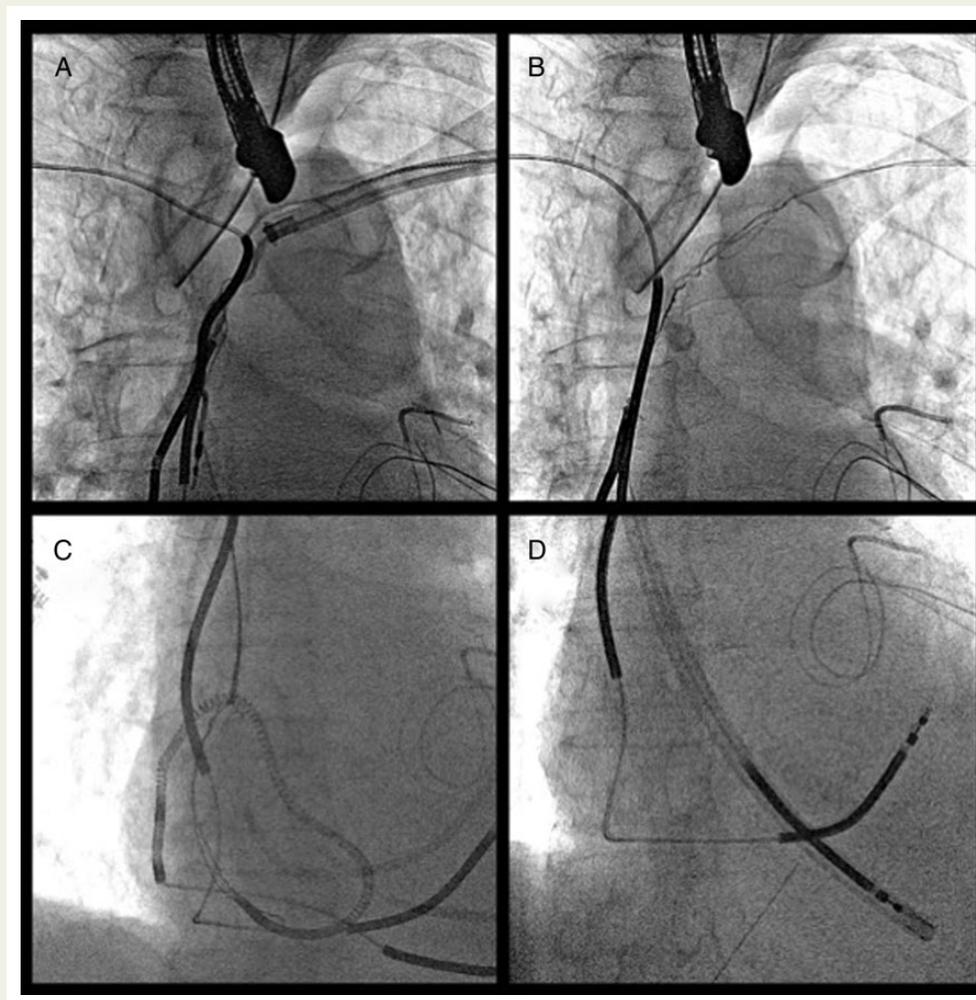


Figure 1 Using a superior approach, the atrial lead was dissected free and removed (A). The right ventricular lead began to disintegrate during advancement of an Evolution sheath around it (B), so was pulled through its binding sites to the right atrium from an inferior approach resulting in de-spiralling. It was then grasped from a right jugular approach (C) and a Cook Evolution sheath was used to dissect over it to the right ventricular apex (D).

advance a mechanical sheath beyond the sternoclavicular junction. The leads were abandoned, a new single-chamber ICD implanted on the opposite side.

At 6 months before referral, surgical extraction was attempted using a mini-thoracotomy in the right anterior third intercostal space, but abandoned as traction on the leads caused severe hypotension. Sternotomy and cardiopulmonary bypass were avoided because the patient's grave illness and history of coronary bypass surgery. The epicardial atrial lead was removed, the other leads left in place.

At the time of referral to us, the patient had a 6-week history of pyrexia, blood culture yielding MRSA, rising inflammatory markers and explantation-site breakdown emitting pus despite therapy with vancomycin, tazocin, and rifampicin.

Under general anaesthesia, the atrial lead was removed without difficulty using a 9 F Evolution mechanical sheath (Cook Medical, Bloomington, IN, USA) (Figure 1A). The LV lead was removed via the right femoral vein using a Byrd Workstation and a Needle's Eye Snare. The right ventricular defibrillator lead was extended using a Bulldog Lead Extender and partially freed using an 11 F Evolution Shortie set. The lead began to disintegrate (Figure 1B), so the Byrd Workstation was used to pull it inferiorly through its venous and atrial attachments, de-spiralling it in the process (Figure 1C); it was then grasped using a gooseneck snare via the jugular vein, and an 11 F Evolution was used to dissect over this to the lead tip removing it completely (Figure 1D). No complication occurred; procedure duration was 293 min, fluoroscopy duration 67 min. Despite our advice, the patient refused extraction of the recently implanted single-chamber ICD.

The patient made an uncomplicated recovery. He died of progressive heart failure 9 months later without further evidence of infection.

Discussion and conclusions

Surgical extraction is often viewed as the only option when transvenous lead extraction fails, but the rate of major complications is greater than for transvenous extraction,^{1,2} albeit in a difficult patient subgroup. Our case demonstrates that failure of previous percutaneous or open surgical lead extraction approaches can occur and do not preclude subsequent successful transvenous extraction. A successful extraction service requires imaginative engagement both from physicians with surgical expertise and with those with percutaneous experience.

Supplementary material

Supplementary material is available at *Europace* online.

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