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Know when not to pull: lessons from complex ICD lead extraction, right-sided reimplantation, and defibrillation testing

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Introduction: Transvenous lead extraction (TLE) for device infection is particularly challenging with long lead dwell time, multiple leads, calcification, venous obstruction, or previous failed attempts. Recognizing these features should prompt referral to an experienced extraction centre with immediate surgical backup.[1] We report an infected implantable cardioverter-defibrillator (ICD) system requiring complex extraction, contralateral reimplantation, and defibrillation testing.

Case report: 28-year-old man with arrhythmogenic right ventricular cardiomyopathy received a left-sided ICD at the age of 12, underwent ventricular tachycardia ablation in 2011, implantation of an additional right ventricular pacing lead in 2012, and generator replacement in 2014. During another generator replacement in 2025, marked calcification surrounding the generator and leads was documented. Three weeks later, purulent pocket discharge developed without evidence of systemic infection. Following two unsuccessful extraction attempts at the referring hospital, the leads were transected and left in situ. He was transferred with an infected calcified pocket and previous right iliofemoral deep vein thrombosis. Echocardiography showed right ventricular dilatation and dysfunction without definite lead vegetation. TLE was performed under general anesthesia with cardiac surgical backup. Left femoral venous access, intracardiac echocardiography, and a guidewire for an occlusion balloon were established. Abundant purulent material was evacuated. The transected 17-year-old ICD lead and damaged 13-year-old pacing lead were secured using locking stylets and lead extenders and extracted with 11- and 13-Fr rotational mechanical sheaths. A distal pacing-lead fragment measuring <1 cm was retained, consistent with the EHRA definition of clinical procedural success. Complete capsulectomy and extensive debridement were performed. Six days later, following clinical infection control, a single-chamber ICD with a dual-coil lead was implanted through the right cephalic vein in an antibacterial envelope. Given the right-sided placement, an R-wave amplitude of 4 mV, and the exclusion of right-sided implants from major trials supporting omission of testing, ventricular fibrillation was induced, appropriately detected, and successfully terminated.

Conclusion: Infection accompanied by long lead dwell time, multiple leads, calcification, or inadequate extraction facilities should prompt referral to an experienced TLE centre before the first attempt. Repeated attempts and lead transection may increase subsequent complexity without achieving infection source control. After infection, the indication for reimplantation should be reassessed and, when required, the new system implanted at a distant site after infection control. Defibrillation testing remains reasonable following right-sided transvenous ICD implantation.

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LITERATURE

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